

THE AUK:

A QUARTERLY JOURNAL OF

ORNITHOLOGY.

VOL. XX.

OCTOBER, 1903.

No. 4.

FURTHER NOTES ON THE PHILADELPHIA VIREO,
WITH DESCRIPTION OF THE NEST AND EGGS.

BY WILLIAM BREWSTER.

Plate XI.

IN THE 'Bulletin of the Nuttall Ornithological Club' for January, 1880, I published some 'Notes on the Habits and Distribution of the Philadelphia Vireo (*Vireo philadelphicus*).'¹ This article was followed in 1897 by Dr. Dwight's 'A Study of the Philadelphia Vireo (*Vireo philadelphicus*),' which gives by far the fullest and best account of the bird's habits, and especially of its song, that has ever appeared. Of its breeding habits we still know very little. "On the 9th of June, 1884, while camped near Duck Mountain," Manitoba, Mr. Seton found a nest which "was hung from a forked twig about eight feet from the ground, in a willow which was the reverse of dense, as it grew in the shade of a poplar grove. The nest was pensile, as usual with the genus, formed of fine grass and birch bark. The eggs were four in number, and presented no obvious difference from those of the Red-eyed Vireo, but unfortunately they were destroyed by an accident before they were measured The bird on being shot answered perfectly to Coues's description, except that on the breast it was of a much brighter yellow than I was led to expect." (Ernest E. T. Seton, Auk, II, 1885, pp. 305, 306). The identification of this nest must be accepted, of course, as wholly satisfactory, but that of

the nest taken in 1895 at Lansdowne, Ontario, Canada, by Mr. Young and attributed by him with apparent confidence to the present species, leaves much to be desired. The parent birds, he tells us, were merely "observed" through "strong field glasses." Although "decidedly smaller than the Red-eye" they were "more bulky in shape," while "the yellow shading of the breast was not very evident." These statements are not calculated, on the whole, to inspire confidence, especially as Mr. Young admits that he "had never met with the species before." Had he been familiar with its appearance in life he would have known that it looks less instead of "more bulky" than the Red-eye and that the yellow of its under parts is invariably conspicuous when the bird is viewed in a good light. The chances are that the Vireos he saw were merely small individuals of *V. olivaceus*. At all events the record is not supported by good enough evidence to be worth serious consideration. The nest to which it relates was built in a low shrub (*Spiraea salicifolia*) and contained, in addition to two eggs of the Cowbird, a single egg of the rightful owner which "was marked exactly like that of the Red-eye Vireo but was smaller, and according to its size was rather more globular in shape" (C. J. Young, Auk, XV, 1898, pp. 191, 192).

As I reported in 1880 (in the article above mentioned), the Philadelphia Vireo is a not uncommon summer resident of the region lying about Lake Umbagog in western Maine and northern New Hampshire where its favorite haunts are second-growth woods about the edges of farms or other openings and burnt lands sparsely covered with young poplars and paper birches. In places of this character I found it very generally if somewhat sparingly distributed during the greater part of June, 1879, but although the behavior of several pairs which I had under almost daily observation that season convinced me that they were breeding I failed to discover any of their nests. Nor was I more fortunate in 1881 when the numbers of the birds appeared to be unchanged. My next spring visit to Umbagog was made in 1896 when, with the assistance of Mr. C. H. Watrous, Mr. R. A. Gilbert and one of the local guides, I devoted upwards of five consecutive weeks (May 12-June 15) to looking for rare birds and nests in the immediate neighborhood of the lake. The corre-

sponding period of the following year was also spent in the same locality with the same companions. The field work accomplished during these two seasons was by far the most thorough and successful of any that I have ever done, before or since, in this region, yet on both occasions I failed to meet with the Philadelphia Vireo after the close of its vernal migration, although I searched for it faithfully and persistently in the places where I had seen it in former years, as well as in other similar localities. Whether it was really absent during these two summers or, for some reason, not in full song up to the date of my departure—in which case I might easily have overlooked it—I am not, of course, able to say, but I can confidently affirm that it reoccupied certain of its ancestral haunts near the southern end of Lake Umbagog during the past season, and that at least one pair attempted to breed there, for I found and took their nest and eggs.

This piece of good fortune fell to my lot quite unexpectedly and by the merest chance—as so often happens in such cases. I had gone to the lake on June 11 with no thought of doing any field work but chiefly for the purpose of superintending the packing and shipment of a portion of my camping outfit for which I had prospective use elsewhere. The 12th and 13th were stormy days, admirably adapted for continued and contented application to drudgery of this kind. On the 14th, however, the weather was perfect, and as my task was practically finished I started for a walk immediately after breakfast. On reaching the woods I found them so very wet, after the heavy rains of the preceding two days, that I was glad to follow a road that led through an extensive tract of second growth poplars and paper birches, intermingled with a few balsams and red spruces. I had gone but a short distance into this cover, when an unfamiliar looking plant growing by the roadside arrested my attention. As I paused to examine it, I became conscious that a Vireo which I took, at first, to be a Red-eye, was singing in an aspen (*Populus tremuloides*) directly overhead. No doubt I had been hearing him for some time, letting the sound "pass in one ear and out the other," as most of us are accustomed to do when the tiresome 'Preacher' is holding forth. Nor is it likely that the song of this particular bird would have finally attracted my notice had it not suddenly

occurred to me that the notes of the Philadelphia Vireo are closely similar to those of the Red-eye and that I had found the former species in this very same piece of woods in 1879. No sooner had this thought entered my mind, than I began to give critical attention to the voice that continued to come almost unceasingly from somewhere among the upper branches of the aspen. It was exceedingly like that of *Vireo olivaceus* but pitched in a slightly higher key, while the notes were less varied and separated by decidedly wider intervals. One of them, moreover, was dissimilar in form to anything that the Red-eye habitually utters. As I noted these slight peculiarities it came back to me that they were all characteristic of the song of the Philadelphia Vireo which, by the way, I had last heard in 1881, and hence did not remember very vividly. All the while I had been momentarily expecting to get a sight at the singer, or, at least, to ascertain his exact position, for there was not a breath of wind and no bird, however small, could have stirred among the easily agitated leaves of the aspen without betraying his whereabouts. The leisurely, halting song, however, continued to afford the only tangible evidence that a Vireo was concealed somewhere among the dense, deep green foliage. After encircling the tree a dozen times or more, tilting my head upwards until the muscles of my neck ached intolerably; I lost all patience and deciding that the bird must be sitting quite motionless on some leafy twig—as Vireos will sometimes do for many minutes at a time, when singing in the heat of the day—I collected a number of stones with the intention of throwing them at random into the denser parts of the tree, hoping thereby to dislodge the sluggish bird. Just as I was about to carry this plan into effect it occurred to me that the males of certain of our New England Vireos are given to singing on the nest while taking their turns at incubating the eggs.¹ This reflection caused me to drop the stones and begin looking for a nest instead of a bird. A few moments later I saw, through an opening in the foliage, in the very middle of the tree, scarce ten feet below its topmost twigs and fully thirty feet above the ground, a globular object of a light

¹ I have never known the Red-eye to do this but it is a common if not regular practice with the Warbling and Solitary Vireos.

grayish brown color. Holding my glass on it with some difficulty — for I was now actually trembling with excitement — I made it out clearly to be a small, neatly-finished and perfectly new-looking Vireo's nest attached to a short lateral twig of one of the long, upright terminal shoots that formed the crown of the aspen. Looking still more closely I could see the head of the sitting bird and even trace the swelling of his throat and the slight opening of his bill as he uttered his disconnected notes. Soon after this he left the nest and flying to a neighboring tree alighted on a dead twig where I had a clear view of him and quickly satisfied myself that without question he was a Philadelphia Vireo. He looked no larger than a Nashville Warbler, and his breast, when he turned it towards the sun, appeared bright yellow, while his throat was unmistakably — if less strongly — tinged with the same color. It was fortunate that I was able to thus positively identify him by sight at this particular time. Had I not done so I should have continued my walk without troubling myself further about either him or his nest, for the song which he now began — and continued, with occasional brief pauses, for upwards of ten minutes — was to my ears *absolutely indistinguishable from the typical song of Vireo olivaceus*. The voice appeared to be the same in pitch as well as quality, the notes similar in both form and expression, and the delivery equally rapid. I regret that it did not occur to me to time the number of separate utterances per minute, but I feel sure that there must have been as many as the most voluble 'Preacher' often succeeds in producing. Dr. Dwight says that "*V. philadelphicus* sings at the rate of from twenty-two to thirty-six notes a minute, averaging a trifle over twenty-six, while *V. olivaceus* rattles on at the rate of from fifty to seventy, their song rate averaging a trifle over fifty-nine." This, no doubt, is ordinarily true, but equally without question the rule just quoted is not always adhered to by either species — as, indeed, Dr. Dwight seems to have known, or at least suspected. His comparative description of the songs of the two birds is so good and true at most points that, as a whole, it is not likely to be ever improved upon. Nevertheless by reason of its very depth and subtlety of analysis it tends to obscure what is really the crux of the whole matter, viz., the fact that the differences with which it deals so

ably are too slight and inconstant to be easily recognized or safely relied on as a means of identification. In other words, only those who possess critical and highly trained ears can hope to distinguish the Philadelphia Vireo from the Red-eye by its song alone, while even the experts in such matters are likely to be occasionally deceived.

The bird which we left perched on the dead branch remained there, as I have just said, upwards of ten minutes, basking in the sunshine and pouring out a perfect flood of song. At the end of this period he flew directly back to the nest and on entering it at once resumed the listless, interrupted singing which I have already described. I am nearly sure that he did not again leave it that forenoon, for whenever I revisited it—as I did every fifteen or twenty minutes—I found him still there and still singing. He seemed rather ill at ease, keeping his head in almost constant motion and occasionally turning half around in the nest. Once he stretched his neck well out and down over the rim to seize the loose end of one of its component strands, which he tugged at so violently with his bill as to perceptibly shake the whole structure. Perhaps this was done merely to relieve his evident ennui, or he may have been giving vent to irritation caused by the prolonged absence of his mate, who was not seen at all on this occasion.

When we took the nest, early the next morning (about six o'clock), the male was again sitting and beguiling himself as before by frequent snatches of his leisurely song. He did not leave the nest until my assistant, Mr. Gilbert, reached and slightly shook the branch to which it was attached, when he flew directly off out of sight through the woods—no doubt in search of his mate, for he returned with her a few minutes later. Both birds came close about Gilbert's head while he was still in the top of the tree, making their low scolding note which so closely resembles that of the Warbling Vireo, but the male seemed shy and suspicious and soon departed again. The female was much tamer and showed more concern, remaining in the tree until she was finally shot—just after the nest and eggs had been safely lowered to the ground. On skinning her I found that she would have added no more eggs to the three perfectly fresh ones which were found in the nest.

The nest was hung, after the usual Vireo fashion, in a fork between two diverging, horizontal twigs. One of these, a lateral branch from the upright shoot already mentioned, is rather more than a quarter of an inch in diameter and evidently formed the chief support, as the other twig is scarce thicker than the flower stem of a buttercup. The nest is firmly bound to both for some distance along its rim. It is much longer than broad, measuring externally 3.20 inches in length, 2.75 in width, and 2.65 in depth; internally 2.00 in length, 1.50 in width, and 1.35 in depth. Its walls are more than half an inch thick in places, its bottom almost a full inch. It appears to be chiefly composed of interwoven or closely compacted shreds of grayish or light brown bark, apparently from various species of deciduous trees and shrubs as well as, perhaps, from dried weed stalks. The exterior is beautifully decorated with strips of the thin outer bark of the paper birch, intermingled with a few cottony seed tufts of some native willow still bearing the dehiscent capsules. Most of these materials are firmly held in place by a gossamer-like overwrapping of gray-green shreds of *Usnea*, but here and there a tuft of willow down or a piece of curled or twisted snow-white bark was left free to flutter in every passing breeze. It would be difficult to imagine anything in the way of external covering for a bird's nest more artistically appropriate and effective. The interior, too, is admirably neat and pretty, for it is lined with the dry, tan-colored needles of the white pine (among which are a very few slender blades of grass), arranged circularly in deep layers around the sides and bottom of the cup in which the eggs were laid. Most of these materials are also used habitually by the Red-eye, but the nest of the latter is seldom, if ever, so liberally and tastefully decorated. That of the Solitary, however, is occasionally ornamented in much the same way and to a nearly equal degree. The nests of both these species, as well as those of the Warbling and Yellow-throated Vireos, are almost invariably larger, rounder and relatively shallower than this nest of the Philadelphia which, indeed, most nearly resembles that of the White-eyed Vireo in size and proportions, although the nest of the latter is usually much deeper and more purse-shaped.

The eggs measure respectively .80 x .54; .81 x .53 and .79 x

.54 (one hundredths of an inch). They are elongate ovate in shape and pure white, sparsely spotted with burnt umber, chocolate and dull black. Most of the markings are small and rounded while many of them are mere specks. On two of the eggs they are rather generally distributed save about the smaller ends which are immaculate, but on the third egg they are practically confined to the larger end. All three eggs resemble most closely those of the Red-eyed Vireo but they are decidedly smaller than average eggs of that bird, while in respect to shape they are unlike any Vireo's eggs in my collection, a peculiarity which is not likely to prove constant, however. Many of my Red-eye's eggs have similarly clear white shells, but all the eggs of the Warbling Vireo, in my collection, are more or less strongly tinged with cream color, and with most of them the dark markings are blacker and somewhat coarser than in these eggs of *V. philadelphicus*.

As I have already said, the Philadelphia Vireo's nest found in Manitoba by Mr. Seton was only about eight feet above the ground, in a small willow, while that which I took at Lake Umbagog was at a height of fully thirty feet in a well-grown aspen. Which of these two situations comes the nearer to being the usual or typical one cannot be settled, of course, on the basis of evidence so scanty and conflicting as that above mentioned. No doubt the nest will be found to vary considerably in position—as well as details of construction—in different regions or even with different birds in the same region; but I am now inclined to believe (although with Dr. Dwight I have hitherto had a directly opposite impression) that in northern New England, at least, it will prove to be ordinarily built, like that of the Warbling Vireo, in the tops or among the upper branches of good-sized trees. If this be so it is no longer difficult to understand why those of us who have spent season after season in places where the Philadelphia Vireo breeds rather numerously have looked in vain for its nest in thickets or among the lower branches of the trees.

AUDUBONIANA.

BY S. N. RHOADS.

THE three Audubon letters herewith presented recently came into my possession and were found to contain so much of an apparently unpublished character of interest to ornithologists that it was thought best to have them printed.

All were written to Edward Harris of Moorestown, one of the most faithful and helpful friends of Audubon during his life, and the one man, not related to the Audubon family, who most substantially aided the widow of J. J. Audubon in the financial difficulties which she underwent just prior to Edward Harris's death in 1863.

The light thrown upon Audubon's relations with, and attitude toward, contemporary American and English ornithologists, especially Townsend, Nuttall, and Bonaparte, is of no small value and significance. So little indeed do we know about Townsend, outside his charming and classic 'Narrative,' that these historic references to him by such a man as Audubon are a precious legacy and but confirm the impression that with Townsend there prematurely perished one of the humblest, gentlest, and therefore truly greatest, of Nature's noblemen.

Perhaps at no period in Audubon's life was the pressure greater, from the literary and scientific side, than when these letters were written to Harris. The insatiable claims of *priority* had taken fast hold upon a spirit naturally averse to technique and artificiality, and in his journal of even date we see how he occasionally revolted against this form of slavery and sighed for the woods and fields.

Within the mere closet naturalist these heart to heart talks of the Great Bird Lover with his scholarly friend may stir no emotions deeper than curiosity, but there are others who can keenly sympathize with Audubon's struggles in a foreign land to forestall his friendly rivals on both sides of the Atlantic, and can forgive the importunity, suspicion, vanity and supersensitiveness which tormented his artistic, freedom-loving soul in the greatest crisis of his life.

LETTER NO. 1.¹

Duplicate

London, Oct. 26th., 1837.

I have this moment received your dear letter of the 4. instant, for the contents of which, I do indeed most truly thank you, but the most important point contained in it, Dr. Spencer is now at Paris quite well and quite happy. I have not heard of his supposed intentions to visit Russia, at least not until you have shewn yourself in Europe for awhile. When will you come? I have not received one single letter from Dr. Morton since my return to England, and have been the more surprised at this, because I look upon *him* as a worthy good man and as on one whom, since my last visit to him, I cannot but consider as my friend.

The return of Dr. Townsend to our happy land has filled me with joy, and trebly so when you tell me that he is as friendly disposed to me as I ever have been towards him. I congratulate you, my dear friend, in the step which you have so kindly taken in my favour, by first selecting all such Birdskins as you or Townsend have considered as new, and also in having given freedom to Dr. Morton to pay Dr. Townsend Fifty Dollars for the skins selected by you, under the *prudent* considerations or restrictions talked of in your letter. May I receive all the Bird skins very soon, for depend upon it, now or never is for me the period to push on my publication. If I have any regret to express it is, that Townsend or Dr. Morton or yourself did not at once forward to me the *whole* of the Bird skins brought latterly by Townsend, for I can assure you that it has become a matter of the *greatest nicety* to distinguish the slight though *positive* species lines of demarkation between our species of Birds — and if on this reaching you, the least doubt exists amongst yourselves respecting any one, why send it to me at once by the very earliest conveyance. If by New York, with letter to M. Berthoud to lose not a day, provided a packet, either to *Liverpool*

¹ Outside address:

To Ed^d Harris Esq^r.
Moorestown New Jersey
9 miles from Philadelphia Pennsylvania
U. S. A.

or London, is ready to sail! Had Townsend sent me the *whole* of his disposable birds, I might now have perhaps been able to have mad[e] him a remittance in cash, which the single arrival of the German Naturalists, who are now in California may hereafter put an end to. Mention this to him, nay, shew him this letter if you please and assure him that I am willing to exert myself in his behalf. Indeed, I wish you to urge him in forwarding me either his own manuscripts or a copy of all such parts as appertain to Birds, as soon as possible, knowing (I think) that he will not undertake to publish them himself under his present (I am sorry to say) embarrassed pecuniary circumstances. Tell him that I want all about the habits of *any* Birds which he has written upon, especially, however, those found from the beginning of his journeys until his return, and appertaining to species belonging to our fauna or otherwise. Their exact measurements, dates, localities, migrations or vice versa inclinations, descriptions of nests, eggs &c. periods of breeding; in a word all that he can, or will be pleased to send me — and you may assure Townsend, that all he will confide to me will be published as coming from *him*, although I may think fit to alter the phraseology in some instances. Tell him to be extremely careful in the naming his new species, and that [if] he thinks of difficulties in this matter, to leave it to me, as *here* I am able to see all the late published works (and they are not a few) and work out the species with more advantage than any one can at present in Philadelphia. Do not take this as egotism far from it, it is in friendship and for his sake that I venture on undertaking such an arduous task. I am *exceedingly* [anxious] to receive a letter from him (for Nutall, though an excellent friend of mine and a most worthy man, will not answer me in time on this subject) of *all* the birds contained in the *plates* now at the Academy of Natural Sciences in Philada., which *he saw on the Rocky Mountains*, over those mountains, *on the Columbia River* and off the coast of our *Western boundaries*. This I want much, and if he would simply dictate to you plate 1. not there, plate 2. there, plate 3 there &c. &c. this would amply answer my purpose, and this I wish you not to neglect to forward me *as soon as possible by duplicate!* Of course I cannot speak upon any one of the new species of which you speak until I have examined them all. To talk of new species in

London is a matter not now understood in any part of America, and sorry will you be as well as himself, when I assure you that out of the *twelve* supposed to be, and published by Dr. Morton, from Townsend's first cargo, not more than six are actually undescribed, although I have taken upon myself the risk of publishing *his* names to the Birds on my plate, but which of course I am obliged to correct in my letter press. *The little beautiful owl*, I would venture to say has been described by Vigors at least ten years ago, &c. &c. Swainson never goes to bed without describing some new species, and Charles Bonaparte, during his late visit to London, has published as many as 20 of a night at the Museum of the Zoological Society Insects &c. &c. Stir, work hard, [be] *prompt* in everything. My work *must* soon be finished, and unless *all is received here* by the month of May next, why I shall have to abandon to others what I might myself have accomplished. God bless you, many happy years. We are all well, thank God, just now. Remember me and us kindly to all around and every friend and believe me ever your most truly and sincerely attached friend,

John J. Audubon.

To Edward Harris, Esq^{re}.

Addressed, care "Messrs. Rathbone, Brothers & Co.
When you send to Liverpool. Liverpool."

¹If Townsend has brought Birds Eggs, ask him to send them me. I will return all to him that he may want. I greatly regret that you did not find me the *water* Birds of which you speak, as I might have perchance found something new or curious among them. The Golden Eye Duck especially, if any he had?

J. J. Audubon.

¹This paragraph, with the signature, is the only part of this letter in Audubon's own hand. The preceding portion was a copy of his draft, and marked "Duplicate." Undoubtedly Audubon had to make so many alterations in the original that he was ashamed to forward it. The address on the wrapper is Audubon's penmanship.

LETTER NO. 2.¹Edinburgh, 14th. Sep^r., 1838.

My Dear Friend:

Not having received anything from you in answer to my last, I suppose that you may yet be away from Glasgow, but as we ourselves are going off tomorrow morning to the "Highlands," with a view to be at Glasgow on Thursday next, I write to you now, with the hope of meeting with you *then*! Nothing of importance has occurred here since my last, but the *book* has considerably swollen in its progress towards completion.

We all unite in best wishes to you and I remain as ever your most truly attached and sincere friend,

John J. Audubon.

We intend being at home again on Saturday next.

LETTER NO. 3.²

Edinburgh December 19th., 1838.

My Dear Friend:

Your letter of the 13th. instant to Victor reached us this morning, and glad were we all to hear from you.

My object in writing to you is, for the purpose of assuring you that I feel great in preparing a box of bird skins for you according to your desire. It is true, however, that as I am now on the eve of commencing my synoptical arrangement of our birds, I shall not be able to show you as many of my specimens I could otherwise have done, but you must take the will for the deed. The

¹ Outside address:

To Edward Harris Esqr.
Comrie's Royal Hotel,
Glasgow.

² Outside address:

To Edward Harris Esqr.
Care of Messrs. Hottinguer & Co.
Paris.

Box will be taken as far as London by Victor, who will leave us on the first of January. You will find in it a list of the contents, and I trust such bird skins as may answer your purpose well. Besides these Victor will also attend to your request as soon as in New York and will ship to you by way of Havre as you direct.

I am glad that you should have seen what you conceive to be the great *rara avis* *F. Washingtonii*. I am sorry you could not have pocketed it, but who knows if it is not left yet in store for you and I to shoot a pair of these noble birds at The West, and that, after having satisfactorily examined its habits, its eggs, or its young! *Bonaparte*, between you and I, is exceedingly ignorant as regards our birds, as I found to my cost when he was in London, and where he pumped me sadly too much, but it is now over and I forgive him as I do all others who have or who *may* try to injure me.

John Bachman wrote to me that he had left in commission to Trudeau, the purchase for me of a copy of Vieillot's *Osieaux de l'Amérique Septentrionale* and also a copy of Boié or Bojé work on birds generally, but I have received neither books or promises of them from Trudeau. Pray ask him something upon this subject, and if he has not purchased them as yet, perhaps you would undertake the task yourself, and show to Havell as soon as possible, for I shall be sadly in want of them in a few weeks more. I should also like you to try to find Mr. Augustus Thorndike of Boston, to whom Victor wrote a few days ago, with the view to enquire from that Gentleman when he wished *his* copy of the *Birds of America* to be delivered. Victor addressed the letter to "his Hotel" or to the care of the "American Embassy." We are not sure, however, whether he is in Paris at present, and let me know what discoveries you have made as regards this. — Victor will remain ten days in London and wishes you, should you write to him there, to put your letter *under cover* to *Havell* and request him to *keep* it. Victor will write to you from thence.

I cannot account why Trudeau has not written to me in answer to my last, now full two months old? Should you *perchance* discover a specimen of the *Bird of Washington* in Paris and purchase the same, I should like you to send it me *on loan* to enable me to compare it with mine, and the Immature of the *F. Albicilla of Europe*!

I have got twelve sheets of the 5th. Vol. of Biographies already printed, and I expect to have quite finished by the 1st. of April next. I have decided on the *Trichas* resembling *Sylvia Philadelphia* of Wilson. It is a distinct species, but what will probably surprise you more, the *S. Agilis* of the same author is also perfectly distinct from either. All this you will plainly see when you read their separate descriptions and compare the three species.

I wish you would ask Trudeau whether *he* recollects the specimen of an Eagle sent by Townsend in his first collection, numbering 54 and which the latter has lost, though he considered it as a new species. It was procured in California. Townsend speaks sorrowfully of the loss of this specimen. It never came under my eye, did it come under yours? Ask Trudeau whether he ever saw my *Hirundo Serripennis* in America, Bachman wrote to me that Trudeau thought he had at New York in the skins of Frederick Ward. I think Trudeau will be pleased with the anatomy of our birds, as it opens misteries hitherto unknown in connection with the relative affinities of some species toward others and assists in the formation of groups &c., in what some day or other, will be called a *Natural arrangement*!

I wish I could have spent a few weeks in Paris with you and Trudeau, as I readily imagine that some new species of North American birds may yet be found there unknown to the World of Science. I have written to Mr. Chevalier and to Townsend, but will not, I dare say, hear anything more of the former until through Victor, who intends to see him very shortly after his arrival in America.

My Dear Wife is much better than when you saw her, and I hope that when once again she has been safely landed on our shores and enjoyed the warmth of our own Summers, her health will be quite restored.

The *Little Lucy* has grown as fat as butter, and the rest of us are well.

We all unite in kindest best wishes to you and to Trudeau, and I remain as ever, my Dear Friend,

Yours,

John J. Audubon.

6 Alva Street.

NOTES ON THE BIRDS PECULIAR TO LAYSAN
ISLAND, HAWAIIAN GROUP.¹

BY WALTER K. FISHER.

Plates XII-XVI.

WE DO not naturally associate land birds with tiny coral atolls in tropical seas. It is therefore a strange fact that such a diminutive island as Laysan, and one so remote from continental shores, should harbor no less than five peculiar species: the Laysan Finch (*Telespiza cantans*) and Honey-eater (*Himatione freethi*), both 'drepanidid' birds, the Miller Bird (*Acrocephalus familiaris*), the Laysan Rail (*Porzana palmeri*), and lastly the Laysan Teal (*Anas laysanensis*). I use the term 'land birds' loosely, in contradistinction to sea-fowl, multitudes of which breed here throughout the year. The presence of these species is all the more remarkable because none appear on neighboring islands, more or less distant, some of which are very similar to Laysan in structure and flora.

Reaching out toward Japan from the main Hawaiian group is a long chain of volcanic rocks, atolls, sand-bars, and sunken reefs, all insignificant in size and widely separated. The last islet is fully two thousand miles from Honolulu and about half-way to Yokohama. Beginning at the east, the more important members of this chain are: Bird Island and Necker (tall volcanic rocks), French Frigate Shoals, Gardner Rock, Laysan, Lisiansky, Midway, Cure, and Morell. Laysan is eight hundred miles northwest-by-west from Honolulu, and is perhaps best known as being the home of countless albatrosses.

We sighted the island early one morning in May, lying low on the horizon, with a great cloud of sea-birds hovering over it. On all sides the air was lively with terns, albatrosses, and boobies,

¹ These notes were made during a visit of the Fish Commission steamer 'Albatross' to Laysan, May 17 to 23, 1902, and are abridged from a more extended report on the avifauna of the island, to appear in the Bulletin of the U. S. Fish Commission.

and we began to gain some notion⁴ of what a pandemonium the distant swarm was raising. We landed on the west side, where there is a narrow passage through the breakers, which curl with beautiful hues on the coral reef, and then sweep shoreward with flying foam.

Mr. Max Schlemmer, the superintendent, his two assistants, and a couple of dozen Japanese laborers constitute the human population. The phosphate rock is very valuable for manufacturing fertilizer, and is worked assiduously during the summer months. To Mr. Schlemmer the expedition owed much, for his unfailing courtesy and substantial aid very materially promoted the success of our week's visit.

Laysan is a slightly elevated atoll, rudely quadrilateral in contour, and suggests a shallow basin or platter. It is three miles long by one and one half broad. In the center is a wholly enclosed lagoon, covering perhaps one hundred acres. This is surrounded by a broad, level plain, that part nearest the very saline waters of the lagoon being destitute of any vegetable life. From this plain the land rises as a gentle sandy slope to a low divide or rim (about twenty-five feet above the water) near the sea beach. Not a tree breaks the monotonous expanse, but instead are low bushes (*Chenopodium sandwichicum*, *Santalum freycinetianum*, *Scævola kœnigi*) and broad areas of high, tussocky grass. On the narrow seaward slope the turf is short and wiry, and a broad band between the bare shores of the lagoon and the beginning of the bush-grass is covered mostly with matted beds of succulent *Portulaca lutea*, and reddish-flowered *Sesuvium portulacastrum*. Beautiful morning-glories, yellow *Tribulus* (reminding one of *Potentilla*), showy *Capparis*, and numerous other flowers add a bit of color to the landscape.

Laysan is a bird paradise. Albatrosses (*Diomedea immutabilis* and *D. nigripes*) by the thousands rear their young here each year, free from fear of molestation or injury. More numerous even are the Sooty Terns (*Sterna fuliginosa*), while the Gray-back Tern (*S. lunata*), White Tern (*Gygis alba kittlitzii*), Noio (*Micranous hawaiiensis*), and Noddy (*Anous stolidus*) are all abundant. Attractive and interesting birds are the boobies, of which two species, *Sula cyanops* and *Sula pectorator* are on the

island in large numbers. The droll Frigate Bird (*Fregata aquila*) is here in all the glory of his bright red gular 'balloon,' and the splendid Red-tailed Tropic Bird (*Phaethon rubricaudus*) in satiny plumage of the palest rose pink, is a familiar member of the community; as he nervously flits by in the tropical sunshine his feathers glisten with the lustre of burnished metal. Among the Procellariidae, the Bonin Petrels (*Astrelata hypoleuca*) may be mentioned as exceeding even the Laysan Albatross in numbers, but as they live in deep burrows one would hardly think it. Next come the Wedge-tailed and Christmas Island Shearwaters (*Puffinus cuneatus* and *P. nativitatis*), which are abundant, and the rare Sooty Petrel (*Oceanodroma fuliginosa*) nests in some numbers during the winter months.

We were at once impressed by two striking facts: the great numbers of birds and their surprising tameness. Especially true is this of the sea-fowl. They seemed little put out by our presence and pursued their ordinary duties as if we were an essential part of the landscape. Even the land birds were fearless. While we sat working, not infrequently the little warbler, or Miller Bird, would perch on our table or chair backs, and the Laysan Rail and Finch would scurry about our feet in unobtrusive search for flies and bits of meat. Each day at meal-time the crimson Honey-eater flew into the room and hunted for millers. As we strolled over the island the Rails scampered hither and thither like tiny barnyard fowls, but soon returned, craning their necks to discover why they had so foolishly retreated. As for the sea-birds there was scarcely a species that seriously objected to our close approach, or at any rate departed when we attempted to photograph them. In fact the albatrosses were astonishingly fearless, and would sometimes walk up and examine some portion of our belongings, as if they had known us always.

It is far from my intention to speak of the sea-birds in detail but merely to sketch hastily, though perhaps inadequately, the conditions and creatures amid which the five peculiar land birds have presumably been evolved.



LAYSAN FINCH AND NEST.

LAYSAN FINCH. *Telespiza cantans* *Wilson.*

The Laysan 'Finch' is a stocky, independent creature about the size of a Black-headed Grosbeak, and its appearance strongly suggests one of the big-billed finches. The fully adult bird is a light rich yellow, greenish on the back, and a deep brownish on the wings and tail, the coverts and secondaries edged with yellowish, and this plumage is not assumed until the individual is over a year old, or perhaps not before the second season. The female is like the male but a trifle duller in tone. Both illustrations of Plate XII show the species in the subadult, brownish, streaked feathering, which it will be seen is worn through the first nesting season.

Telespiza and the next species considered, *Himatione freethii*, are placed in the Drepanididae, a family peculiar to the Hawaiian Islands. The differences between these two birds seem great, and in fact about the only common character uniting the many diverse species into the composite family is the peculiar disagreeable musky scent said to emanate from birds in the flesh. I detected no such odor on either of the Laysan species, but it may have escaped me. The origin of the Drepanididae remains still a sealed book, but their affinities seem to be American.

We much enjoyed the company of the Laysan Finch. He is a sociable, saucy and fearless fellow, and captivates one by his nonchalant, independent air. We could not walk anywhere without encountering them singly and in little companies—the latter being mostly males—diligently searching for food among the bushes or frolicking, toward the center of the island, in open stretches covered with portulaca and a pinkish flowered sesuvium. When disturbed they eye the intruder in an inquisitive, half-doubting manner, and utter their mellow, linnet-like call. If pursued they do not fly far, but escape by running along the ground, or suddenly crouching under a grass tussock. Not infrequently they hopped about the piazza where we were preparing specimens, and sought for food beneath the chairs. One day when I was alone and quite still, a handsome male alighted on a table at my elbow and proceeded to explore a large heap of loose papers. He was soon lost in the rustling pile, which he demolished with great energy in his search for novelties.

Telespiza is not particular as to its food, but is fond of the soft parts of grass stems, tender shoots of bushes, seeds, and especially of sea-fowl eggs. I once frightened a tern off her 'nest,' and almost immediately a pair of Finches flew to the egg. One of them cracked a neat hole in the shell with a few strokes of its powerful beak, and began to feed, although I was hastily adjusting a camera only a yard or two away. Nor did the removal of some rocks which obscured the view bother them greatly, for they merely hopped a few feet away and watched me calmly, resuming their repast as soon as I had finished. (Plate XIII, Fig. 1.) But suddenly a Rail rushed out of the grass, and with feathers erect made for the Finches in such a determined manner that the pair flew away and left *Porzana* sole possessor. The latter lost no time in finishing the egg. (Plate XIII, Fig. 2.) Undoubtedly the finches eat a goodly number of eggs in the course of the season, for this was not the only case observed.

Their favorite nesting site is in the middle of a big tussock of grass, somewhat nearer the ground than *Himatione* and *Acrocephalus* usually build. *Chenopodium* bushes are also frequently used for we found nests here, as well as in grass clumps bordering the open near the lagoon — a location very popular with all the land birds. In each instance, in the latter case, the nest was wedged in the center of a tussock, well hidden by tall grass stems. It is constructed of handy materials, such as rootlets, twigs, and coarse grass, and the whole is rather loosely put together. The shallow cup, $2\frac{1}{4}$ inches in diameter, is lined with shredded grass. The position and character of the nest is shown in Plate XII.

There are three eggs in a complete set, although we found some nests with only two. A fairly typical specimen is bluntly ovate, of lustreless white, with small blotches and spots of light sepia and lilac gray, crowded toward the larger end, and very sparingly present on the acute half. Sometimes the spotting is distributed evenly over the whole surface. There is much variation in size and color. A typical example measures 24 by 18 millimeters.

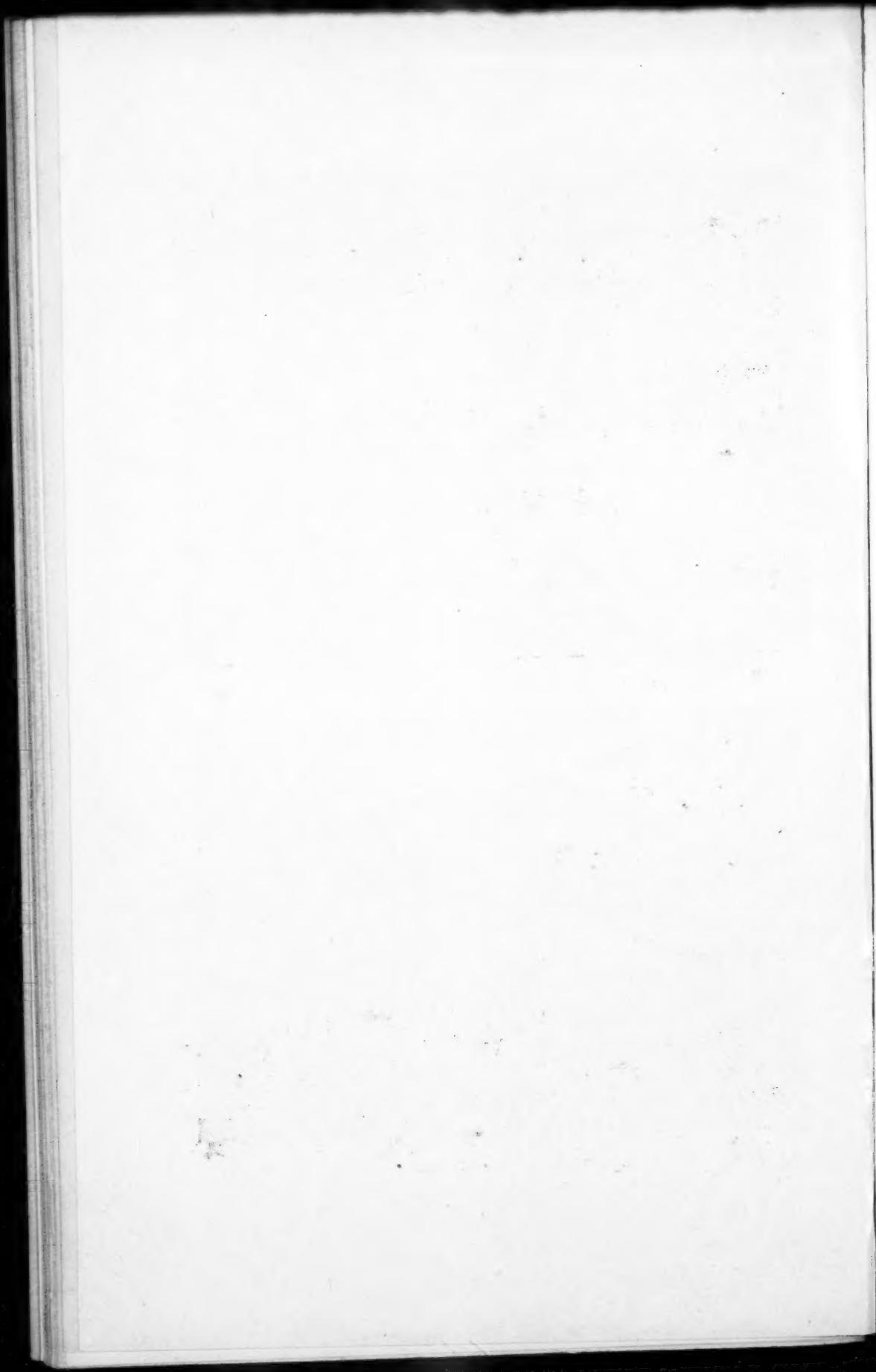
The finches were so unsuspicious that I had little difficulty in securing photographs of them at the nest. The reader must remember that none of the various precautions usual in bird photography were here taken. The camera was within a few feet



FIG. 1. LAYSAN FINCH EATING TERN'S EGG.



FIG. 2. LAYSAN RAIL EATING TERN'S EGG.



of the nest, in plain sight, and the operator was seated beside it waiting his chance. The bird in the pictures spent much of its time scratching sand, just behind the grass tussock, and would occasionally hop onto the edge of the nest to see what was happening.

LAYSAN HONEY-EATER. *Himatione freethi Rothschild.*

The Laysan Honey-eater is a brilliant little bird, about the size of a warbler, and very attractive when seen flitting here and there in the soft green of chenopodium bushes. Its plumage is of a lustrous scarlet vermillion, brightest on the crown, with wings, tail, and abdomen a dull sepia.

They are most abundant in the interior of the island near the open plain bordering the lagoon. Here on the extensive beds of succulent portulaca they may be seen throughout the day, busily walking about like pipits, either gathering insects or drinking honey from the numerous half-blown buds. The brush-like tongue of these creatures renders the gathering of honey, and such tiny insects as may infest the interior of corollas, an easy task. In fact it was no uncommon occurrence to see one go from flower to flower, and insert its bill between the petals of a nearly opened bud, with a certain precision and rapidity which suggested a hummingbird, except of course that the Himatione was on its feet.

I also observed them catching green caterpillars from *Chenopodium sandwichicum* bushes, the leaves of which resemble those of its well-known congener — our garden pig-weed. The Honey-eaters are partial to small brownish-gray moths or 'millers' which abound on the island. While we were at lunch, nearly every day a Himatione flew in and extracted these creatures from cracks between boards. It then grasped the miller with one foot, after the manner of a bird of prey, clinging with the other to the rough board wall, and ate the soft parts of its quarry. After a few moments the still fluttering victim was released, and the destructive search resumed. It became evident that the millers, relieved of important parts of their anatomy, did not thrive after such treatment. We heartily wished the little bird good luck, for the

millers left unpleasant memories, and likewise the imprint of their fuzz on many of my negatives.

The nest, like that of *Telespiza*, is built in grass tussocks, about two feet from the ground. The structure is loosely made, of fine grass and rootlets, and the dainty bowl is lined with rootlets and brown down from young Albatrosses (*Diomedea immutabilis*). There are no large white feathers in the lining, at once making the nest distinguishable from that of *Acrocephalus familiaris*, which builds in neighboring tussocks. The complete set seems to be four. The ovate egg is pure lustreless white, blotched and spotted at the large end with grayish vinaceous, and with fewer light and dark spots of Prout's brown. A typical specimen measures 18 by 13.75 millimeters.

Himatione freethi is closely related to the Apapane (*H. sanguinea*) of the larger Hawaiian Islands. The derivation of the two Laysan Drepanidæ is therefore rather plain, for although *Telespiza* is a monotypic genus, it belongs with the large-billed genera *Chloridops*, *Rhodacanthis*, and *Loxioides* of Hawaii, *Pseudonestor* of Maui, and *Psittacirostra* of Kauai, Oahu, Molokai, Lanai, and Hawaii.

MILLER BIRD. *Acrocephalus familiaris* (Rothschild).

The sociable little Miller Bird is one of the Reed Warblers belonging to the Sylviidæ, a characteristic Old World group, although a certain American genus, *Polioptila*, is also included in the family. It is curious that nowhere else in the whole Hawaiian group does any species of *Acrocephalus* occur. The genus is a wide ranging one, extending over the whole of the central and southern Palæarctic Region, having also representatives in Australia and South Africa, while one division of the group is exclusively Polynesian. Many of the species are highly migratory, and winter in the tropical regions of Asia and Africa, and in the islands of the Malay Archipelago. But the subgenus *Tartare*, or genus as some consider it, to which the Laysan bird belongs, is a distinctly Polynesian group. It is distributed over the islands between 30° north latitude and 30° south, and between longitude



FIG. 1. ACROCEPHALUS FAMILIARIS AND NEST.



FIG. 2. NEST OF ACROCEPHALUS FAMILIARIS.

120° or 125° east and 120° or 125° west. Oustalet¹ considers that this restricted group, *Tartare*, which has only eight oceanic species shows perhaps closer affinities with *Berniera* of Madagascar, than with the European and Asiatic *Acrocephalus* (*l. c.*, p. 210). *Tartare luscinia* is found on Guam and Saipan, *T. syrinx* in the Carolines and on Pagan of the Mariana Islands, *T. rehsei* on Pleasant Island, *T. equinoctialis* on Christmas Island, *T. pistor* on the Fannings, *T. mendanae* on the Marquesas, *T. longirostris* through the Society and Paumota Archipelagos, and finally *T. familiaris* on Laysan. I am not aware with what species *familiaris* shows closest kin, but *à priori* one would rather favor the idea that the first colonists to Laysan came from the Carolines or the Ladrones (Mariana Islands) rather than from the south, for the reason that the genus is not present in the main Hawaiian group.

The Miller Bird is one of the most abundant of the species under consideration and is seen to best advantage during the cool of the morning or in late afternoon, for then it is very active, and at times musical. During the heated portion of the day, after the custom of our wood warblers, it retires to remain in seclusion among shady bushes, or tall tussocks of grass where its nest is made. Like most of the birds on the island *Acrocephalus* is rather unsuspicious, though not by any means so tame as either the Finches or Rails. I have read that its congeners in other parts of the world are quite shy, but many rules usual in bird manners seem here to be thrown aside. That the little creatures are far from nervous is demonstrated by the accompanying illustration (Plate XIV, Fig. 1). The camera was planted about thirty inches from the nest, and when everything was arranged I crouched under the instrument, and waited quietly for five minutes till the bird returned.

Whenever in evidence *Acrocephalus* always appears busy. It feeds largely on moths and other insects, and receives its local name from a fondness for millers, which, as already intimated, abound on the island. The little warbler drags these insects from their secluded hiding places with much skill. Its dull brownish-

¹ M. E. Oustalet, *Les Mammifères et les Oiseaux des Isles Marianne* Nouvelles Archives du Museum, 3rd series, VII, 1895, 212.

olive plumage renders it inconspicuous, and one scarcely takes notice when it flies about the verandas, or into the dark corners of a room, searching for its favorite food. We often saw this species with *Himationes* gleaning insects in the broad purslane beds near the lagoon.

The nest is built usually in the midst of a big tussock of grass, and the birds seem to congregate along with the Finches and Honey-eaters near the open plain, several times mentioned in foregoing pages. We were puzzled to find many nests entirely completed, but without eggs, and finally concluded that the birds had not yet begun to lay in any numbers. Only two sets, one of three and the other (incomplete) of two, were taken. The nest is composed of dried grass stems and blades, fine rootlets, and is lined with rootlets, shredded grass and white albatross feathers, some of the last being woven into the coarser structure of the nest. These feathers are strictly characteristic of all the nests we found, so that the Miller Birds probably began very long ago to make use of this convenient material. None of the other birds use the large white feathers, although as already stated the *Himatione* employs soft albatross down. The eggs vary in ground color from the palest olive buff through greenish white to almost pure white. The markings consist of olive blotches and spots of various intensities, crowded at the blunt end, and likewise very tiny lines and specks, scattered over the whole egg. Sometimes there are drab shell marks. One egg was as small as 19 by 14 millimeters and another as large as 22 by 15.

LAYSAN RAIL. *Porzanula palmeri Frohawk.*

The Laysan Rail is a wide-awake, inquisitive little creature with a seemingly insatiable desire for first-hand knowledge. It is one of the most naïve, unsophisticated, and wholly unsuspicious birds in the whole avian catalogue. Usually it is confiding and familiar in its relations with man, yet sometimes holds aloof with a show of reserve. It will occasionally hide behind a bunch of grass, as if afraid, and then suddenly saunter forth with entire change of demeanor, and examine the intruder with critical care. One can



FIG. 1. LAYSAN RAIL ON NEST.



FIG. 2. NEST OF LAYSAN RAIL.

never tell just how he will be received by the next Rail. Often they scurry away as if pursued by a *bête noir*, but an insect will stop them in their mad career, and, having promptly disposed of this interruption, they seem to forget their former fright and walk about stretching their necks in a highly inquisitive manner. It is evident that they are incapable of pursuing any train of thought for more than an instant. Their ideas seem to flash by in kaleidoscopic succession, and within a minute they make as many false starts as a monkey. One can scarcely imagine more foolish and amusing little birds than these.

Porzanula palmeri is a very distinct form, and whence the original colonists came is rather difficult to conjecture. Just why these first birds never left the island, as the Golden Plovers do now, is also hard to say; unless, driven by strong winds they were so completely worn out and lost that they never dared to abandon the welcome land. The fact remains that they did not leave, and we now find a bird resembling *Porzana* in most respects, but with wings wofully useless and short. The *Porzana* type of coloring is present in a much lighter and bleached form.

The Rails are everywhere on the island in great numbers. There is scarcely a bunch of grass but harbors a pair. They probably have no serious enemies, so that the only check to their increase is space and food supply. It is possible Man-o'-war Birds may pick one up now and then, especially the chicks, but I saw nothing to substantiate this. Yet the Rails like to slink about in the shade of grass tussocks or bushes, much in the same way that a chipmunk seeks the shadow of a log in preference to crossing a bright sunny space. This trait suggested the idea that they might have winged enemies. However if necessity or even inclination calls, the Crakes show no aversion to coming out into the sunshine, especially for food, so that perhaps it is the hot sun which causes them to retire to cooler by-ways.

They spend a large part of their time creeping, mouse-like, in and out of nooks and crannies, as if trying to satisfy their genius for exploration. Old petrel burrows fallen in, low-bending bushes and grass tufts are searched with care and precision in this unending quest. As they walk their heads are thrust forward from side to side, the very pictures of inquisitive interest. They used some-

times to come up and peer at my shoes, with one foot poised in air. Scarcely a thing escapes their beady red eyes. The smallest spider or beetle is snapped up with as much avidity as a more conspicuous seed.

We caught all our specimens in an ordinary dip-net. Usually it was only necessary to place the net on the ground edgewise when presently a rail would make its appearance and proceed to examine the 'new phenomenon' at close range. Often they would fairly walk into the net, and Prof. J. O. Snyder obtained a photograph illustrating this amusing incident.

In strolling through the brush we could hear the Crakes calling here and there. Their song is a plaintive high-keyed little rattle which resembles remotely an alarm clock with a muffled bell, or pebbles ricocheting on a glass roof. I have observed them standing under bushes in the shade rattling away in this manner, with swollen throats and bills slightly opened. I once saw two approach one another, with feathers erect and heads lowered, and begin rattling in each others face. Then they suddenly ceased and slunk away in opposite directions.

At the house the little Rails walked about the veranda in search of food with far less fear than the chickens, and while Prof. Snyder and I were preparing specimens, not infrequently a Rail or two would be walking under our chairs, searching for morsels of meat. They took no notice of Albatrosses and other sea birds. I saw two in a lively serpentine chase about a young Gony's legs, the big creature appearing like an uncouth mammoth above the trim little Rails.

They do not seem to exhibit any desire to fly, probably having learned from experience that their wings are no longer to be relied upon. I have only seen them spread their wings when hopping up to a perch, or when running fast. I often chased them to see if they could rise from the ground, but they would not even try.

Their food consists of small insects, seeds, green material, and sea-birds' eggs. Their beaks are rather weak, and I doubt if they break any eggs except the thinner shelled ones of the terns. I did not myself see the Rail actually puncture an egg, but in Rothschild's "Avifauna of Laysan," the following note from Henry Palmer's diary is of interest.

"While out this morning both my assistant and I saw a little Rail break and eat an egg. We had disturbed from its nest a Noddy (*Anous*); immediately the Rail ran up and began to strike at the egg shell with its bill, but the egg being large and hard, he was quite a long time before making a hole. The Rail would jump high into the air, and come down with all its force on the egg, until it accomplished the task, which once done the egg was soon emptied. By this time the Tern came back and gave chase, but in vain." (*L. c.*, pt. I, p. x.)

Porzanulas lurk about the outskirts of tern colonies all the time, and I once had to frighten a Crake from the nest of a Tropic Bird, while attempting to photograph the egg. I also saw a Rail rush at some Telespizas and drive them from a tern's egg, upon which they were feeding, as related in the account of the Finch. The Rail then set to and finished the repast, dragging the embryo about in an ineffectual attempt to swallow it. With such habits it is difficult to see how these creatures can ever seriously be at a loss to find food.

The following episode illustrates, I think, very forcibly the fearlessness of these Rails. While photographing a nest, I propped back the mass of sedge stems which obscured it. The camera was only a few feet away, and during the adjusting of apparatus, the Rail crept onto the eggs and energetically began to cover herself with the soft lining. After photographing her several times, I lifted her off, and moved the camera still closer, but almost at once she slipped back again, and settled down contentedly. Then, with the focusing cloth I persuaded her to retire to the tall grass, near at hand. I ran back to the camera, but on turning perceived my rail skipping across the flattened grasses in hot pursuit, and I was able to make only a hasty inspection of the ground-glass before she had settled on the nest again. It was under these circumstances that Plate XV, figure 2, was secured. Figure 1 of the same plate shows the Rail.

The Rails make their nests either in the midst of thick tussocks of tall grass, near the ground, or else in close-matted clumps of a *juncus*-like sedge, which grows in a narrow band along the outermost edge of the lagoon-plain, just where the area of bushy grass and brush begins. We had only to walk over the tangled beds of

this sedge, and watch where the Rails ran out, when a nest could easily be found. It is placed on the ground at the end of a little tunnel, about five or six inches long, and is a roundish cavity, lined above and on all sides, except the little entrance way, with soft dried stems. The eggs are deposited in a little bowl-shaped hollow about four inches in diameter (Pl. XV, Fig. 2). We found several sets of threes and a few incomplete sets of twos. The eggs are large in proportion to the bird, a typical specimen measuring 31 by 21 millimeters, and in contour they are bluntly ovate or elliptical ovate. The ground color is a pale olive buff, closely and rather evenly spotted with pale clay color, or raw sienna, and faint lilac gray. The clay color is brightest and predominates. All the eggs collected were fresh. The young apparently begin to hatch about the middle of June.

LAYSAN TEAL. *Anas laysanensis* *Rothschild.*

That an islet, scarcely three miles in its longest dimension and fully three thousand miles from continental shores, should harbor a peculiar species of the genus *Anas*, is, to say the least, surprising. The birds themselves are scarcely less peculiar than their distribution. Most of us picture ducks as among the wariest of wild-fowl, but the Laysan Teal, though not exactly tame, are at any rate quite unsophisticated.

I have little to record concerning their habits. They congregate about a small sedge-bordered, brackish-water pond near the south end of the lagoon. Here we saw them each day, sunning themselves, and preening their feathers on a little heap of rocks near the center of the pond. We saw them also waddling about in other parts of the island, but not commonly. Near the house there was a pair which probably had a nest in the vicinity, for one of them used to come up to the house after nightfall, and walk about like a barn-yard fowl. Mr. Schlemmer said it was searching for millers. Although these ducks can fly perfectly well, they ordinarily did not take wing until approached within a few rods, and then never went far. They much preferred to walk about, which they did in twos and threes, gleaning their food as they

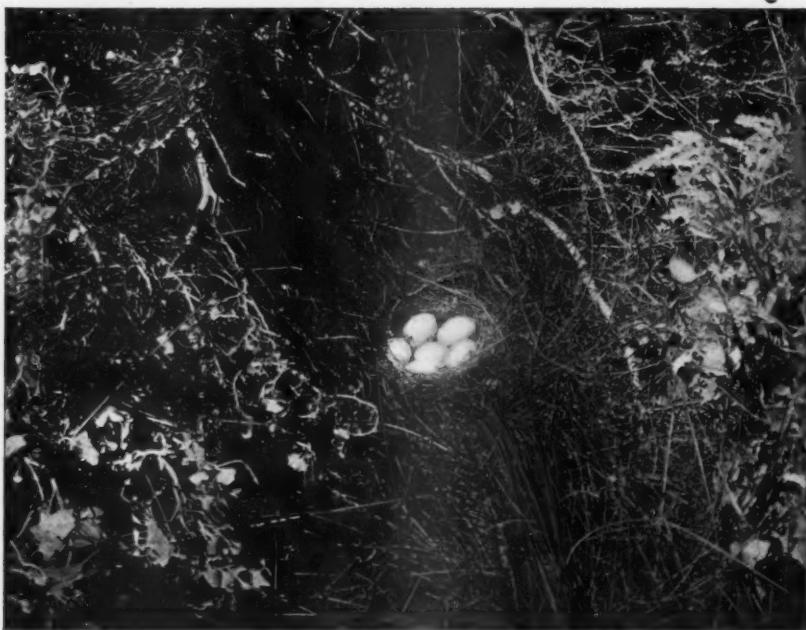


FIG. 1. NEST OF LAYSAN TEAL.



FIG. 2. YOUNG OF LAYSAN TEAL.

proceeded. The stomach of a male collected near the pond was gorged with small flies, resembling the common house-fly. We did not observe any Teal near the ocean and it is probable they never voluntarily take to salt water.

We discovered one nest within a couple of rods of the pond, placed under a thick chenopodium bush. Six eggs of the palest green — almost white — rested in a shallow bowl constructed of long dry sedges. I wished if possible to secure a picture of the female, so I photographed the eggs (Pl. XVI, Fig. 1) and left them till the following morning. But when I returned to the nest, three of the eggs had hatched, one young was half out, and another egg picked. In taking the accompanying photograph (Pl. XVI, Fig. 2), one of the ducklings had to be removed in order to show the others. The type egg was preserved in alcohol. It measures 55 by 38 millimeters, and in contour is a blunt ovate.

A few days later Prof. Snyder saw three old birds with broods, one of which took to the pond. I also saw a baby swimming about, the rest of the family being somewhere in the sedge tangle. These young resemble those of Mallards.

The Teal is the least common of the five species just considered, and although I had no accurate method of estimating I would place the total number of ducks considerably below one hundred. It will be an ill day for all the birds on Laysan, if a cat, pig, or mongoose is ever allowed to land. Any or all of these creatures would make short work of eggs and young birds, and could break up what is probably the most interesting community of sea-fowl in the world.

THE BLACK-WINGED PALM TANAGER.

BY AUSTIN H. CLARK.

THROUGH the kindness of Mr. Outram Bangs, I have been enabled to examine the large series of *Tanagra palmarum melanoptera* (Sclater) in his collection, as well as those in the collection of the Museum of Comparative Zoölogy at Cambridge.

The localities represented in the series, with the number of specimens from each, are as follows: Panama, 19; Santa Marta, 1; Margarita Island, 3; Trinidad, 2; "Venezuela," 1; Yacura, Venezuela, 1; Lake Titicaca, Peru, 2. In addition to these examples, I have, in my tabulation, made use of the measurements given by Mr. Ridgway¹ for skins from the following localities: Costa Rica, 6; Panama, 2; Trinidad, 2; British Guiana, 1; Lower Amazons, 5; Rio Huallaga (Peru), 2. This brings the whole number under discussion up to forty-seven.

For comparison, specimens of *T. palmarum palmarum*, were studied from Santarem (1), Bahia (1), and "Brazil" (3).

The object in view was to observe the variations of this subspecies with regard to its geographical distribution, and to determine whether the northern bird, occurring about Panama, is separable as a valid form, which Ridgway considers may prove to be the case.

Dr. Sclater² gives the distribution of *Tanagra palmarum* as "southern Brazil and Bolivia northward to Trinidad, Venezuela, Colombia, Panama, and Costa Rica." The subspecies *melanoptera* is given³ as occurring in the western part of South America, from Nicaragua south to eastern Peru (type locality), and east to Trinidad, including Colombia, Ecuador, Venezuela, and the Amazons valley. This restricts *T. palmarum palmarum* to eastern and southeastern Brazil, north to British Guiana. Ridgway says that in the same locality in the lower Amazons district, examples occur, representing as to coloration, at least, both forms;

¹ Birds of North and Middle America, Part II, p. 59.

² Catalogue of the Birds in the British Museum, Vol. XI, p. 160.

³ Ridgway, *loc. cit.*

while Sclater states that in Guiana (Demerara and the Mt. Roraima region), Surinam (Dutch Guiana), and on the island of Mexicana (Lower Amazons), intermediate grades occur, the olive-green edgings to the wing feathers in these specimens being only slightly manifest. In the absence of material from these localities, I cannot make any remarks on this point, but I merely wish to call attention to the fact that, while Sclater regards *melanoptera* as a good subspecies of *Tanagra palmarum*, Ridgway is inclined to consider them as entitled to full specific rank.

In the accompanying table are given the averages for all the male specimens from the various points.

From the figures it will be seen at once that, as regards the wing, the largest specimens are from Peru, while the smallest are from Panama; starting at Panama, the average rises west into Costa Rica, and east, through Santa Marta, Yacura, and Margarita Island, to Trinidad. The lower Amazons specimens are the same size as those from Costa Rica, and are smaller than those from Guiana and Trinidad.

MEASUREMENTS OF *Tanagra palmarum melanoptera* SCL.

Localities	Wing	Tail	Ratio of Wing and tail	Culmen	Tarsus
Peru	98.8	76.9	1.28	13.5	21.4
Panama	90.8	68.2	1.36	13.2	20.6
Costa Rica	94.2	71.1	1.32	13	20.8
Santa Marta (1) Colombia . . .	93	72	1.29	11	20
Yacura, Venezuela . . .	94	73	1.28	14	20
Margarita Island	96.3	73.3	1.31	14	20.6
"Venezuela" (1)	100	73	1.37	13	20
Trinidad	97.2	70.8	1.37	14	21
British Guiana	97.5	72.9	1.33	13	20.6
Lower Amazons	94.7	71.4	1.32	13.2	20.8

Tanagra palmarum palmarum Max.

Brazil	99	72.2	1.37	14.5	22.2
------------------	----	------	------	------	------

The tail measurements, however, do not vary in the same way. Although the birds with the shortest tails are from Panama, those

with the next shortest come from Trinidad, while Margaritan birds have the longest of any, with the exception of Peruvian examples. Costa Rican birds are close to those from the lower Amazons.

By dividing length of wing by length of tail, we obtain a ratio between the two. An examination of these figures shows that Peruvian birds have the longest tails proportionately, while those from Trinidad have the shortest. Specimens from middle northern Venezuela (Santa Marta, Yacura, and Margarita) and from Costa Rica are intermediate. Those from Panama resemble most closely Trinidad examples, while the lower Amazonian form agrees with the Costa Rican.

In regard to the length of the chord of the culmen, birds from Yacura, Margarita, and Trinidad exceed all others. Guianan and Costa Rican specimens agree in having very short beaks, while those from Peru, Panama, and the lower Amazons are intermediate.

Tarsal measurements show that Costa Rican and lower Amazonian birds are identical in this character; while Trinidad and Peruvian birds are pretty close, having the longest tarsi. Panama specimens have shorter tarsi, agreeing with those from Guiana; Santa Marta and Yacura ones have the least of all, while the Margaritan form is intermediate between them and the bird of Trinidad.

In measurements the true *T. palmarum palmarum* from southeastern Brazil is larger than the average of the subspecies *melanoptera* examined in respect to length of wing, culmen, and tarsus; but in tail measurements it is near the Santa Martan bird. The ratio between length of wing and length of tail is that of Trinidian *melanoptera*.

In short, then, the specimens of *T. palmarum melanoptera* from Costa Rica show a striking similarity in all dimensions to those from the lower Amazons. Peruvian birds are largest, except for the beak, while Trinidad birds are near them in all respects save in length of tail. Guianan birds are also close, having longer tails than those from Trinidad. There seems to be a regular gradation from Panama along the coast to Trinidad. The most striking fact is the small size of the Panama birds as compared with those from Costa Rica on the west and Santa Marta and Yacura on the east.

There seems to be no constant variation in color; but this character is uncertain in these birds, and differences are to be met with in specimens from the same locality. The violet gloss is the most noticeable feature. This gloss is, however, mainly confined to the distal portion of the feather, and seems to undergo considerable diminution, often a month before the feathers are renewed again. Even in fresh specimens from the same place the difference is considerable, some, apparently adult, having almost none, while others have it very strongly marked.

From the data just given, it appears that, as would be expected, the largest specimen come from the high mountains of Peru. Here doubtless food is comparatively scarce, and a bird must cover a considerable area in order to obtain a sufficient supply. Size, therefore, is a distinct advantage. The lower Amazons supports a small race. Food here is abundant, and so natural selection is not called upon so urgently to weed out the smaller and weaker individuals. The race is small at Panama for the same reason; while mountainous Costa Rica, Santa Marta, Yacura, and Margarita are inhabited by larger birds. Very likely the birds on Trinidad are stragglers from the rough and barren Venezuelan shore, where the small ones have been eliminated.

The series examined contains two interesting specimens. One has a peculiarly long and narrow bill, but is otherwise apparently normal. This bird, a male, was taken on Margarita Island, and was noticed in 'The Auk' for July, 1902, p. 266.

The other is a partial albino. It is a young male¹, and was taken at Loma del Leon, Panama, on March 3, 1900. The left wing has the proximal secondary attenuated, short, and with its basal and central portions white. The next secondary is normal; but the third has a large white distal patch, extending inwards 15 mm. from the tip of the feather. The patch is central in position, and does not reach the border on either side. From the appearance of both these feathers the condition may be pathological.

The Black-winged Palm Tanager is very common on the island of Trinidad, where it can be seen at almost any time about the

¹ Collection of E. A. and O. Bangs, No. 7467.

gardens in Port-of-Spain. It is very active and restless. The song of this bird is unlike that of any of ours, being a quick ascending succession of notes, pitched very high. There is a suggestion of panting and of effort in the song, and its high key, which makes it somewhat squeaky, is rather disagreeable.

NOTES ON THE ANATOMY OF *GEOSPIZA*,
COCORNIS, AND *CERTHIDIA*.

BY ROBERT E. SNODGRASS.

Plates XVII-XX.

Geospiza and *Certhidia* are the two distinctively peculiar avian genera of the Galapagos Islands. The former consists of a large number of species and varieties, and has always been regarded as belonging to the family Fringillidæ. *Certhidia*, consisting of eight varieties comprised in two species, was formerly placed in the Cærebidae, but both Lucas and Ridgway now regard it as belonging to the Mniotiltidæ. *Cocornis* is known only from the small island of Cocos, lying off the Gulf of Panama and northeast of the Galapagos Islands about four degrees north of the equator. It consists of one known species, and has always been assigned to the Fringillidæ. But it has probably been so classified more on account of its general resemblance to *Geospiza* than from a consideration of its own characters.

In all structural points *Cocornis* really resembles *Certhidia* more than it resembles *Geospiza*. To be sure, the adult males of *Cocornis* and of most of the *Geospiza* species are almost plain black, while the adults of *Certhidia* are gray with admixtures of olive and brownish. Yet, in the shape of the bill and in the structure of the skull *Certhidia* and *Cocornis* are almost identical. On the other hand, the structural differences between *Cocornis* and *Geospiza* are slight—the slender-billed *Geospizæ* differ from *Cocornis* in the characters of the skull and skeleton of the bill,

scarcely more than *Cocornis* does from *Certhidia*. The difference is not nearly so great as that between the slender-billed and the thick-billed forms of *Geospiza* itself. Hence, a study of the characters of these three genera, is suggestive of a possible derivation of *Geospiza* from *Cocornis* and of *Cocornis* from *Certhidia*. This, however, would place *Geospiza* in the *Mniotiltidae*!

In the descriptions of the skulls following it will be shown that the *Geospiza* skull departs widely from that of any ordinary Fringillid species. The writer, however, does not possess enough knowledge of comparative avian anatomy to venture any theory on the correct classification of the three genera discussed, or on their possible interrelationships. A few facts are set forth in the hope that they may be of value to others.

It is probably not impossible that *Geospiza*, *Cocornis*, and *Certhidia* may be genetically related. Cocos Island is not very distant from the Galapagos, and an ancestral *Geospiza* could easily have gotten there from the latter place. Moreover the climate and flora are utterly different on Cocos and the Galapagos, and the conditions look very unfavorable for convergent evolution. Some authors have claimed a common geological origin for the islands. In such a case we would look for a relationship at least between *Cocornis* and *Geospiza*.

A study of the plumage phases of the *Geospizæ* shows that they are most probably descended from a plain yellowish-olivaceous bird. They advance through six stages from this to the entirely black phase. The lowest forms never go beyond the third stage, being in this plumage when adult.¹ Therefore, *Cocornis* must have branched off from one of the higher groups, for it is black in the adult stage. This conclusion is not endangered by the fact that it is antagonistic to the assumption that the bill and skull of *Cocornis* are intermediate between those of *Certhidia* and the lowest *Geospiza*. There are four groups of *Geospiza* separable on a color basis, and in each the evolution of the bill has been independent. The lowest members of the higher groups have bills more similar to the Certhidian bill than have those of the lowest

¹ Discussed in Papers from Hopkins-Stanford Galapagos Expedition, No. —, Birds, Snodgrass and Heller (MS.), Proc. Wash. Acad. Sci., Vol.

group, and it is between the former and *Certhidia* that *Cocornis* is really intermediate. The theory above suggested involves the assumption that the four groups of *Geospiza* became differentiated in color before the great variation in the bill took place, and consequently, that *Cocornis* branched off from one of the melanistic groups comparatively late in Geospizan history. Such an assumption is entirely in harmony with the facts discussed by Mr. Edmund Heller and the writer in the paper referred to above in the footnote. The fact that large groups of *Geospiza* are definitely characterized by color, while there is an infinite amount of specific and subspecific variation in the bill, would indicate that the color differences were evolved and stereotyped long before the bill variation began.

What immature stages of *Cocornis* are known indicate that the adult males reach the black phase through paler phases similar to those of *Geospiza*. *Certhidia*, both in the adult and immature stages, is of a plain, pale and comparatively uniform coloration.

I. THE SKULL.

In order to show more strikingly the wide departure that the *Geospiza* skull makes from the ordinary Passerine type, a description of one of the most specialized forms will be given first. The descriptions of other species follow in the order of decreasing modification.

Geospiza strenua Gould (Plate XVII, Figs. 1 and 2).—Ridges of sides and posterior part of skull strikingly prominent; temporal crests parallel; interorbital area on top of skull parallel-sided and almost as wide as the inter-temporal area. In general the cranium, viewed from above, has a curious resemblance to a rodent's skull.

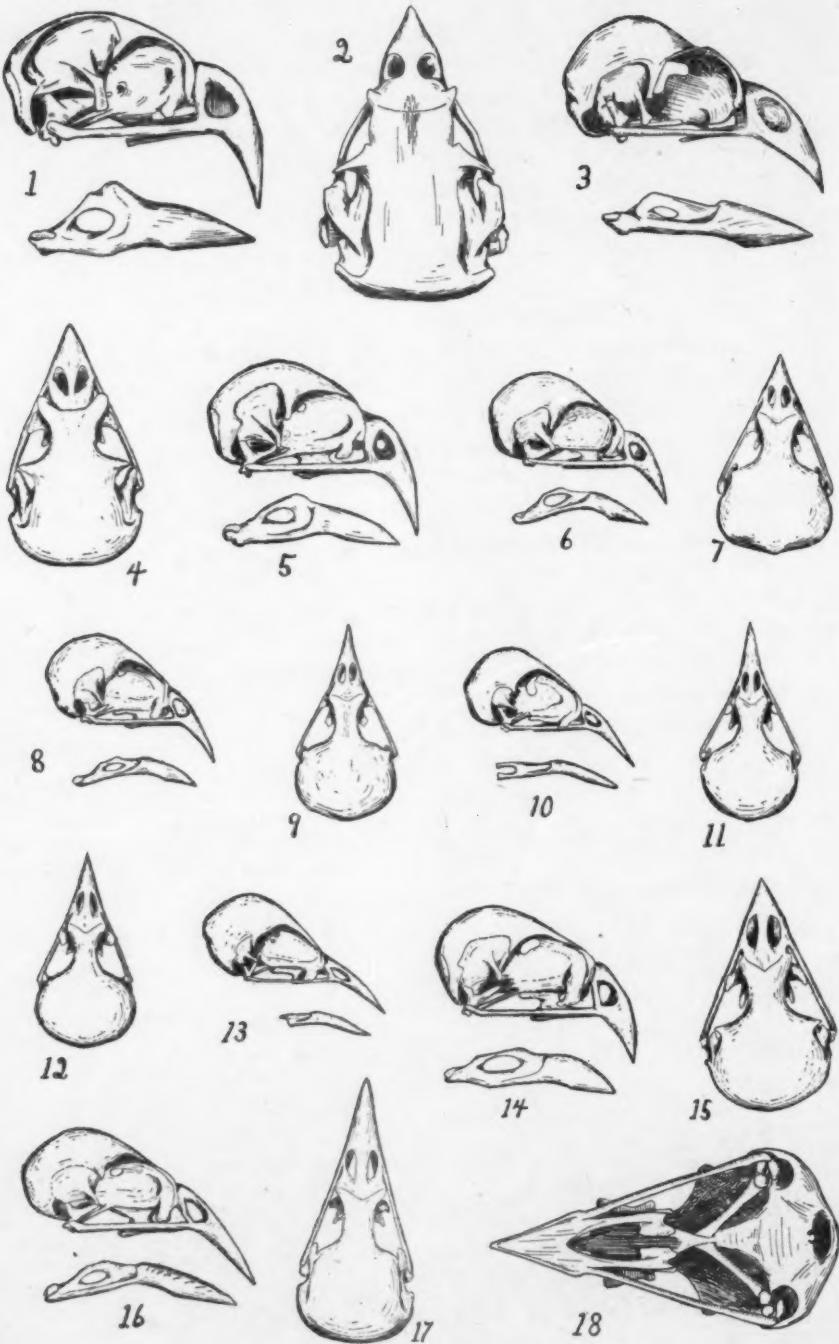
Top of head very smooth. Highest point between tips of squamosal processes; profile descending from here to lambdoidal crest in a regular curve, to base of culmen less steeply and in more nearly a straight line. Space between temporal crests transversely flat, *i. e.*, the crests are coincident with the dorsal profile. Interorbital area much wider than long, depressed mesially and declivous toward each lateral margin, the anterior margin nearly straight. Postfrontal process large, trihedral and unciform. Tem-

poral crest extremely large and high up on side of cranium, curves upward and posteriorly from posterior angle of base of postfrontal process, posteriorly it curves downward and ends in rather prominent process above ear. This crest is greatly larger than in such thick-billed genera as *Cardinalis* and *Zamelodia* (Pl. XVII, Fig. 3). In these latter forms also the crest is far below the dorsal profile of the cranium.

Temporal area very long, its length, from one extremity of temporal crest to the other, equal to distance from anterior end of crest to nostril. This gives an extremely great postorbital length to the skull, the whole configuration of the cranium being very different from that of any ordinary Passerine skull. Surface of temporal area slightly depressed and roughened, lacking the glazed appearance of top of skull. Squamosal process very large, its lower end reflexed posteriorly and lying well behind tip of postfrontal process. In *Cardinalis* the tip of the squamosal process is slightly in advance of the tip of the post-frontal process. Crotaphytic depression between post-frontal and squamosal processes wide and deep.

Tympanic region flat and almost vertical. Lambdoidal crest prominent, but smaller than temporal; median part horizontal; lateral parts deflexed and then curved inward, terminating on each side at base of a prominent mastoid process back of lower part of ear opening. This mastoid process is absent or but poorly developed in other Passerine genera examined as well as in other species of *Geospiza*. Posterior surface of skull receding, *i. e.*, when zygomatic bar is horizontal, it extends downward and slightly forward below lambdoidal crest.

Interorbital septum complete, very thick, and composed of a double wall. Preorbital parts of skull of ordinary Fringillid character. Rim of orbit rather thick and heavy in appearance on account of deflexion of lateral part of interorbital area on top of skull. In *Zamelodia*, *Cardinalis*, *Pipilo*, *Carpodacus*, *Astragalinus*, and in other species of *Geospiza* the interorbital surface is evenly concave, giving the orbital rim a much thinner appearance. On posterior wall of orbital cavity are three conspicuous, vertical, crest-like ridges. Lower end of outer one forms a process visible laterally projecting from lower part of crotaphytic depression.



ANATOMY OF *GEOSPIZA*, *COCORNIS*, AND *CERTHIDIA*.

Geospiza fortis and *G. propinqua* possess similar ridges. In *G. fuliginosa* and *G. scandens* there are only traces of them. They are present in some form, either as plates or ridges, in most Passerine skulls, varying greatly in size, but in *G. strenua* they are far larger than in any other skull examined by the writer.

The most striking feature about the skull of the thick-billed *Geospizæ* is the abrupt angle that the tomium of the upper mandible forms with the zygomatic bar. In *G. strenua* this angle is 118° . The same angle in *Cardinalis* is 140° . That is, the deflexure of the upper mandible from the horizontal is 62° in *G. strenua* and only 40° in *Cardinalis*. In *G. strenua* the distal half of the bony culmen forms an angle of 90° with the basal part of the culmen back of the nostril. This angulation is conspicuous in all the species of *Geospiza*, although not so great in the smaller-billed forms, and is characteristic of the genus. In *Cardinalis* and *Zamelodia* there is no such angulation of the culmen in these genera, as well as in smaller-billed Fringillidæ, the culmen forms an even curve from base to tip.

Nasal bones large, the inferior or descending arm of each thick, and forming nearly a right angle with zygomatic bar. Nostril triangular, of almost an isosceles shape, lower rim horizontal and on a level with upper edge of zygoma. Width of base of upper mandible contained $2\frac{1}{2}$ times in greatest posterior width of cranium; depth $1\frac{1}{2}$ times in greatest posterior depth. Internasal septum complete.

Longitudinal bars of palatines thick, diverging slightly posteriorly, outward and downward, so that posterior ends lie below level of zygomatic bar. Posterior ends blunt. Superior internal laminae large, widened at dorsal edges and solidly fused with rostrum of sphenoid, not projecting back of anterior ends of pterygoids. Inferior internal laminae well developed. Lower mandible extremely large, being specially deep just back of middle through coronoid process. Depth here more than a third of the length.

Geospiza fortis fortis Ridgway (Plate XVII, Figs. 4 and 5).—This is one of the species with but a moderately large bill. The interorbital area of the top of the skull is much narrower than in *G. strenua*, being contained $2\frac{1}{2}$ times in the distance between

the temporal crests. The surface is simply concave instead of doubly convex. The temporal crests are relatively small and lie far below the dorsal profile of the cranium, the space between them being strongly arched instead of flat transversely. The space between the postfrontal and squamosal processes is relatively narrower than in *G. strenua*, but the former process ends in advance of the other. The interorbital septum is thin, and is perforated at its upper posterior angle by a hole which is a part also of a foramen opening into the cranial cavity on each posterior orbital wall.

The angle of the tomium of the upper mandible with the zygomatic bar is 122° ; *i.e.*, the deflexure of the mandible is 58° . This is 4° less than the deflexure in *G. strenua*. The angulation of the culmen is about the same in the two species. The internasal septum is not complete in *G. fortis*, forming simply a deep median keel on the under surface of the nasal bones.

The lower mandible is slenderer than in *G. strenua* and the coronoid process is not so high.

Geospiza fuliginosa parvula (Gould). (Plate XVII, Figs. 6 and 7.)—The structure of the skull in this species is very similar to that of *G. fortis*, but in it the points in which the *G. fortis* skull departs from the *G. strenua* skull are still more intensified. Both the temporal and lambdoidal crests are comparatively slight. The temporal crests are situated far down on the sides of the skull, and the top of the skull between them is high and roundly convex. The interorbital space is narrow and simply concave.

The angulation of the culmen is considerably less than in the other two species described. The deflexure of the upper mandible from the horizontal of the zygoma is 50° . This is 8° less than in *G. fortis*. The nasal septum is entirely lacking.

This is one of the smaller-billed species of *Geospiza* and the skull differs conspicuously from that of *G. strenua* in the much slenderer upper mandible and in the general lighter appearance of the preorbital parts. The basal depth of the upper mandible is contained $2\frac{1}{2}$ times in the greatest depth of the cranium.

Geospiza fuliginosa acutirostris (Ridgway). (Pl. XVII, Figs. 8 and 9.)—The skull of this form differs from that of *G. f. parvula* in the slightly slenderer, more tapering and less deflexed upper

mandible. The temporal crest is nearly obsolete, and the temporal area below it is less extensive than in *G. f. parvula*. The interorbital septum is so thin that it is almost membranous. The angulation of the culmen is inconspicuous. The deflexure of the upper tomium is about 48°.

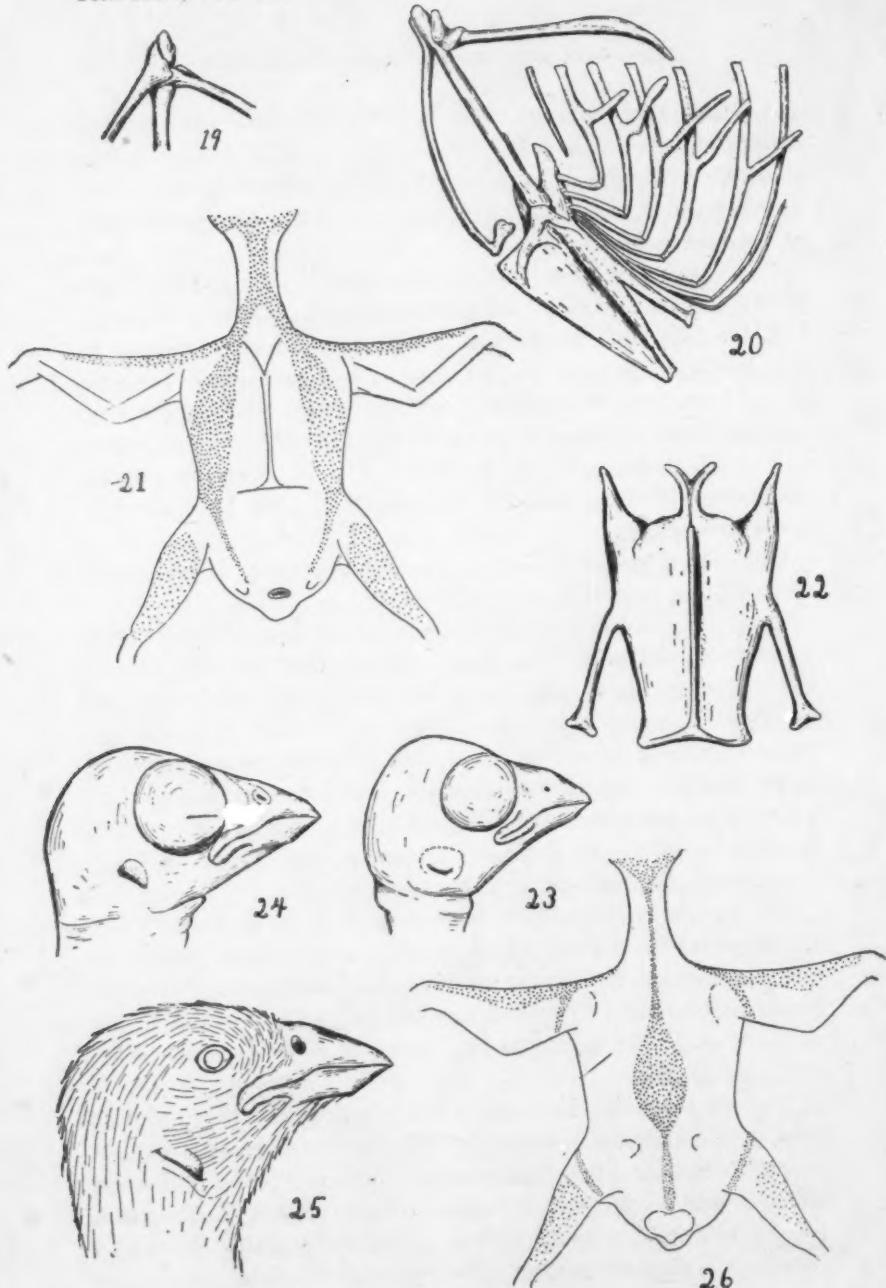
The shape of the nostril changes serially in the four skulls described. In *G. strenua* the nostril is almost an isosceles triangle with the base on a line with the upper edge of the zygoma. In the smaller-billed species, however, the upper angle becomes moved successively farther back, and the angle that the descending process of the nasal forms with the zygoma, which is almost 90° in *G. strenua*, slightly decreases. In *G. f. acutirostris* the upper angle of the nostril lies behind the vertical from the posterior basal angle.

The lower mandible is very slender and there is almost no coronoid process.

Geospiza scandens fatigata (Ridgway). (Plate XVII, Figs. 16, 17, and 18.)—The *Geospiza* group, characterized by a long slender bill, includes a number of forms that were once regarded as constituting a separate genus called *Cactornis*. The supposed species were separated on characters that have since been found to intergrade in such a manner that they can better be regarded as varieties of one species of *Geospiza*. Of this group, which has been reduced to the species *G. scandens*, the subspecies *G. s. fatigata* may be taken as typical.

There is far less difference between the skulls of *G. scandens* and *G. fuliginosa* than there is between the skulls of the latter species and *G. strenua*. That is, the former genus *Cactornis* did not differ in cranial structure from the simpler forms of *Geospiza* nearly as much as did the species in this genus, as at first limited, differ from one another.

The temporal and lambdoidal crests are almost identical with those of *G. fuliginosa*. The tip of the postfrontal process lies but slightly before the tip of the squamosal process. The fronto-nasal suture is deeply concave. It is more concave than in *G. f. acutirostris*, in the latter species more so again than in *G. fortis*, while in *G. strenua* it is almost straight. The angle of the descending process of the nasal with the zygoma is still less than in *G. f. acutirostris*,



ANATOMY OF *GEOSPIZA*, *COCORNIS*, AND *CERTHIDIA*

and the upper angle of the nostril is correspondingly farther back. The angulation of the base of the culmen is slight, and the deflexure of the upper tomium is about 45° , being a little less than in *G. f. acutirostris*.

As will be seen later, the skull of *G. scandens* approaches most closely to that of the genus *Cocornis*. The skull of *G. f. acutirostris* is nearest in size to the *Cocornis* skull, but in structure the *G. scandens* skull is almost intermediate between the two.

A digression from the series will now be made to describe the skull of the Geospizan group having a strongly curved culmen.

Geospiza crassirostris (Gould). (Plate XVII, Figs. 14 and 15.) — This species may be taken as a typical example of the *Geospiza* species formerly included in a separate genus called *Camarhynchus*, a group characterized by having the culmen strongly curved.

The skull of *G. crassirostris* is in every way very similar to that of *G. fortis*. About the only difference is that the culmen is a little more convex than in *G. fortis*, and the upper mandible is deeper in front of the nostril. The crests of the two skulls have about the same development, the interorbital areas are the same, the upper mandibles have the same deflexure, the nostrils are alike, the descending processes of the nasals form the same angle with the zygoma, and the post-frontal and squamosal processes have the same relative positions.

A study of the *Geospiza* skulls shows, then, that the various species and varieties are related to one another mostly in a serial manner. That is, evolution in the group has not been along lines radiating from a common centre, but has consisted principally of successive modifications along one line. This same thing is evinced by a study of the color phases of the plumage.

Cocornis agassizi Townsend (Pl. XVII, Figs. 10 and 11). — The general characters of the skull are almost identical with those of *G. f. acutirostris* or *G. scandens*. The upper mandible, however, is relatively a little slenderer than in either of these, and the deflexure of the tomium is about 40° . This is about 5° less than in *G. scandens*.

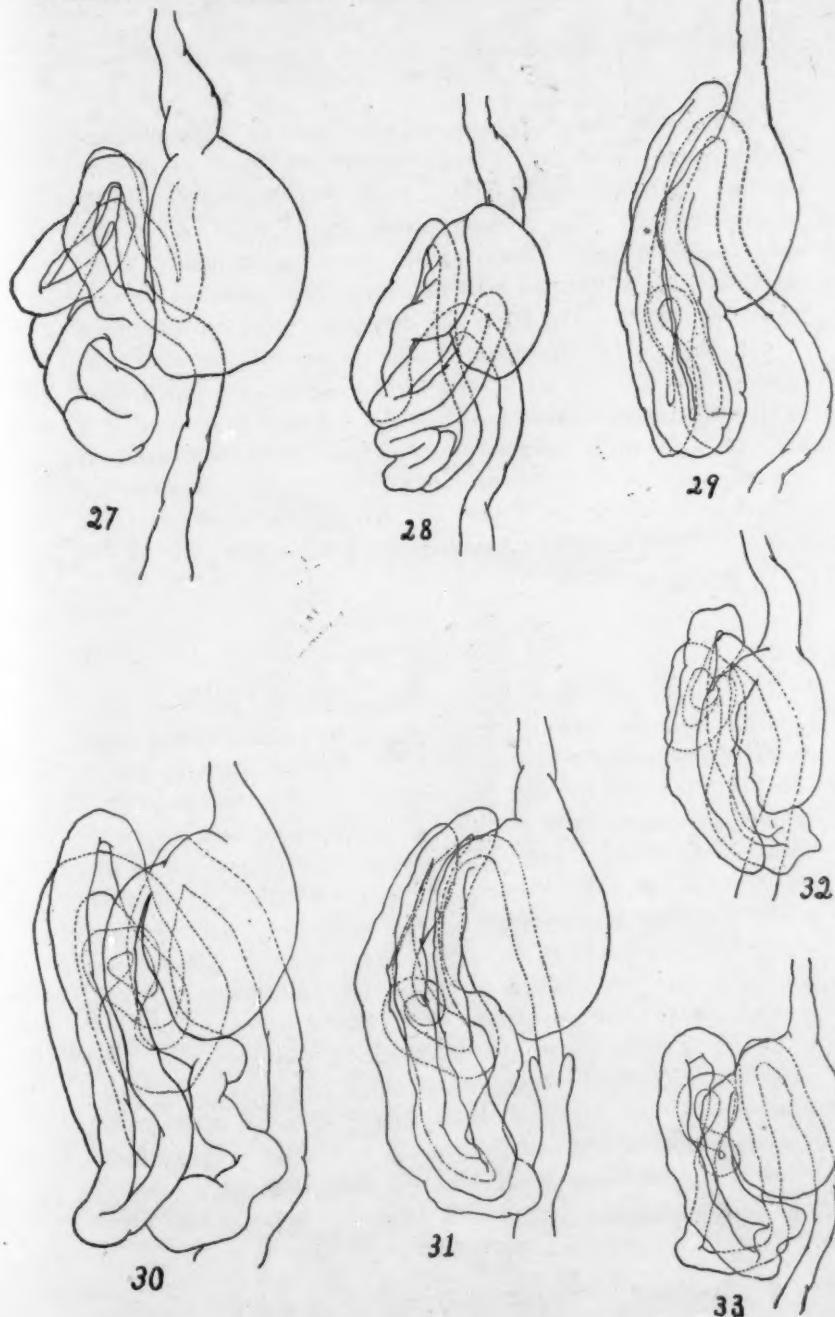
Certhidia olivacea luteola (Ridgway). (Pl. XVII, Figs. 12 and 13). — The skull of *Certhidia* is extremely similar to that of *Cocor-*

nis. It differs from the latter in about the same way that the *Cocornis* skull differs structurally from the skull of *G. scandens*. That is, the upper mandible is slenderer and less deflexed. The angle of deflexure in *C. o. luteola* (and the bill does not vary in the genus) is about 35° . This is just as much smaller than the deflexure in *Cocornis* as the latter is than the deflexure in *G. scandens*.

From the foregoing descriptions it is evident that the species of the three genera under consideration can be arranged in a graded series according to the structure of the skull. Such a series would begin with the members of *Certhidia*, all of which have very slender and gently deflexed bills. Following *Certhidia* comes *Cocornis* with a slender but more deflexed bill. Separated from *Cocornis* by a step no greater than that from *Certhidia* to *Cocornis* comes *Geospiza scandens*. This species, although structurally intermediate between those on each side of it, makes a digression as to size, being much larger than either *Cocornis* or *G. fuliginosa acutirostris* which otherwise follows *G. scandens* in the series. From *G. f. acutirostris* the series is uninterrupted to such forms as *G. strenua* and *G. magnirostris* in which the bill is enormously large and the upper mandible greatly deflexed, and in which the skull has an almost un-bird-like appearance on account of the curious shape and the great development of the crests.

All that the writer here intends is simply to call attention to the fact that there is a gradation in the skull characters of these three genera, progressing by almost equal steps from one extreme to the other. If any phylogenetic theory can be based on this fact then the classification of the three genera accepted at present cannot be correct, for *Certhidia* is regarded as a member of the Mniotiltidae and *Geospiza* and *Cocornis* are placed in the Fringillidae. The *Geospizæ* as birds have certainly a most Fringillid appearance. The same, however, cannot be so positively asserted concerning the skull of even the least modified species.

A study of the bills of nestlings would probably have little phylogenetic value. Three stages in the growth of *G. fuliginosa parvula* are shown in Plate XVIII, figures 23, 24 and 25.



II. THE THORACIC SKELETON.

The sternum, shoulder girdle and ribs show no such modifications as does the skull. The drawings of the parts in *Cocornis agassizi* (Pl. XVIII, figs. 19, 20, 22) may be taken as typical for all three genera. The sternum and shoulder girdle are of ordinary Passerine form. The ribs are somewhat variable. There are always seven that are well developed and generally there is a small eighth rib. The latter is sometimes a mere bar lying back of the lower part of the neural arm of the seventh, but often it is composed of distinct neural and haemal segments. The second to fifth ribs inclusive always have large uncinate processes. On the sixth rib there is sometimes present a well developed uncinate process, but it is often rudimentary and is frequently absent.

Such variations as these have no phylogenetic significance, for they take place between closely related species and also in different individuals of the same species.

III. THE TONGUE.

Geospiza (Pl. XX, Figs. 34-38, and 40).—The tongue of *Geospiza* has a simple tapering shape, varying in length and thickness according to the form of the bill. The thin terminal margin is bifid and somewhat frayed. The upper surface is usually convex, but it is often slightly and sometimes deeply grooved longitudinally. This last character, however, varies between closely related species and even in the same species (Figs. 34 and 37). *Geospiza* is mostly granivorous but partly insectivorous.

Certhidia (Pl. XX, Fig. 41).—The tongue in this genus is the same as in the slender-billed species of *Geospiza*, except that it is more constantly grooved above. It is slender, tapering and bifid at the tip. *Certhidia* is insectivorous.

Cocornis (Pl. XX, Figs. 39 and 42).—In this genus the tongue is very long and slender. It is deeply grooved above, and expanded, bifid and greatly frayed out at the tip (Fig. 39). It differs considerably, as the figures will show, from the tongues of both *Certhidia* and *Geospiza*. The food of *Cocornis* has not been determined, but probably consists mostly of insects.



34



35



36



37



38



39



40



41



42



ANATOMY OF GEOSPIZA, COCORNI, AND CERTHIDIA.

IV. THE ALIMENTARY CANAL.

No descriptions need be given of the alimentary canals. Figures 27 to 33 on Plate XIX sufficiently show the intestinal windings in several species of *Geospiza* and also in *Cocornis* and *Certhidia*. It will be seen that there is no essential difference here between the three genera.

V. PTERYLOYSIS.

The pterylosis is identical in the three genera. Figures 21 and 26 of Plate XVIII, representing the feathered areas of *Cocornis agassizi*, could serve just as well for either *Certhidia* or *Geospiza*. The dorsal tract extends down the back of the neck and between the shoulders as a narrow, median band. On the middle of the back it expands into a wide, fusiform area reaching to the anterior part of the lumbo-sacral region. Here it again contracts to a narrow band, narrowest between the acetabula, and goes caudally to the oil-gland. The ventral tract begins as a median band on the anterior half of the throat. Just below the middle it divides into two bands that go outward and caudally as wide tracts along the sides of the breast. Behind the sternum each becomes again narrow, and goes caudally and inward along the side of the abdomen, ending near the anus. At the shoulder each lateral ventral tract gives off laterally the shoulder tract which divides into the alar and humeral tracts.

EXPLANATION OF THE PLATES.

Plate XVII. SKULLS. Figs. 1 and 2, *Geospiza strenua*; 3, *Zamelodia melanocephala*; 4 and 5, *Geospiza fortis fortis*; 6 and 7, *G. fuliginosa parvula*; 8 and 9, *G. fuliginosa acutirostris*; 10 and 11, *Cocornis agassizi*; 12 and 13, *Certhidia olivacea luteola*; 14 and 15, *Geospiza crassirostris*; 16, 17 and 18, *G. scandens fatigata*.

Plate XVIII. Fig. 19, *Cocornis agassizi*, inner view of bones at shoulder; 20, *C. agassizi*, side view of thoracic skeleton; 21, *C. agassizi*, ventral pterylosis; 22, *C. agassizi*, ventral view of sternum; 23, 24 and 25, *Geospiza fuliginosa parvula*.

side view of head of three nestling stages—primaries 4 mm., 13 mm. and 32 mm. long, respectively; 26, *Cocornis agassizi*, dorsal pterylosis.

Plate XIX. ALIMENTARY CANALS.—Fig. 27, *Geospiza conirostris conirostris* (length 205 mm.); 28, *G. fuliginosa parvula* (length 170 mm.); 29, *G. fortis dubia* (length 204 mm.); 30, *G. crassirostris* (length 255 mm.); 31, *G. scandens fatigata* (length 200 mm.); 32, *Certhidia olivacea luteola* (length 102 mm.); 33, *Cocornis agassizi* (length 125 mm.).

Plate XX. TONGUES.—Fig. 34, *Geospiza scandens fatigata*; 35, *G. habeli*; 36, *G. fortis fortis*; 37, *G. scandens fatigata*; 38, *G. prosthemelas*; 39, *Cocornis agassizi*, tip of tongue; 40, *Geospiza fuliginosa parvula*; 41, *Certhidia olivacea luteola*; 42, *Cocornis agassizi*.

A CONTRIBUTION TO THE LIFE HISTORY OF THE HERRING GULL (*LARUS ARGENTATUS*) IN THE UNITED STATES.

BY WILLIAM DUTCHER AND WILLIAM L. BAILY.

Plates XXI and XXII.

THE facts presented in this paper are the results of several visits to the large breeding colonies of Herring Gulls on the Maine coast, made at the following dates: by Mr. Dutcher, 1900, from June 28 to July 21; 1901, by both contributors, from June 12 to 24; 1902, by Mr. Baily, from July 18 to 20 inclusive. In 1900 visits were made to nearly all of the colonies along the Maine coast by the senior contributor, commencing at the most westerly one on No-Man's-Land Island, which is situated about seventeen miles south of Rockland, Maine, and adjoins the large island known as Matinicus. In 1901 eight days were spent at the lighthouse station on Great Duck Island, and subsequently nearly all of the other colonies were revisited by Mr. Dutcher. In 1902 Mr. Baily revisited the Great Duck Island colony later in the season, in order to observe the methods of feeding the young birds and the habits of the young. A description of the position and

topography of Great Duck Island will answer for all of the island colonies, as in the main they greatly resemble each other. Great Duck Island is situated in $44^{\circ} 9'$ N. Lat. and $68^{\circ} 15'$ W. Lon., being an outlying island seven miles south of Mount Desert Island.

The citizens of Maine have reason to be proud of the gull homes in their State, and it is a civic obligation to care for and preserve them. One of the first duties of the patriotic citizen is to carefully conserve the natural objects in his locality; any one who would destroy them, especially for commercial purposes, is lacking in that uplifting sentiment that develops in man or woman a respect for the rights of others, and a love of country and fire-side. The writer who commands and wields the most facile pen cannot fully describe the life or beauty of one of the great breeding homes of these gulls, nor can the most accurate photograph convey to the reader more than a faint picture of the bright blue sky, the sparkling sea, the graceful motion of the birds circling overhead; nor can it add the roar of the surf on the rocky shore, nor the weird and angry cries and screams of the anxious gulls. The colony at Great Duck Island is without doubt one of the largest now existing in the United States.

The shore of the island is bold and rocky, and, as the tides rise and fall about thirteen feet, at low water great tracts of kelp rock-weed are uncovered, among which the gulls find large quantities of food, such as crustacea and other marine life. At every low tide that occurs during daylight, numbers of gulls may be seen gleaning in the kelp beds, or gathered in groups sunning themselves or preening their feathers.

At high water the upper ledges of rocks are used for assembling and resting places. The surface of the island is somewhat rolling, and in the open is covered with grass and weeds, of not very luxuriant growth, as the soil seems to be very poor, being composed of decayed wood and sand. The trees are principally spruce and fir, but none are of very large size. On the southern end of the island nearly all the trees have been cut and the dead tops and branches, together with many large trunks, have been left among the stumps, making a tangle very difficult to penetrate.

At the extreme southern point of the island the United States



FIG. 1. ROCKY SHORE, GREAT DUCK ISLAND, ME. LOW TIDE.



FIG. 2. HERRING GULLS, GREAT DUCK ISLAND, ME. PROTECTED COLONY.

Lighthouse Department owns a reservation of about two acres. This contains the light tower, three dwellings, engine room, two boat houses, and a long tank-shed for catching rainwater for the fog-whistle engines. The greatest elevation of the island is about sixty feet, the average being about twenty-five feet above high-water mark. The gulls occupy the southern end of the island and are divided into two parts, which may be designated as the east and west colonies. In the former in 1901 there were about twelve hundred birds, and in the latter about eighteen hundred. In 1902 the area of the colony was somewhat larger than the previous year, extending about a hundred yards further northward in the western colony. Probably 3500 birds were breeding, 500 more than last year; on July 15 hundreds of young birds, from a day to three and a half weeks old, were scattered over the two breeding areas.

On our arrival at the island in 1901 nest building and laying was practically completed. One belated gull, however, built and occupied a nest after that date, which afforded us some insight into the method of construction. It was located on a flat rock, as some hundreds of nests were. The rock nests, usually, did not have any stick or twig foundations, but were built of grass, weeds, mosses, lichens, some kelp, either green or dry, feathers, wool, bark, and small bits of drift and rotten wood, all laid upon the rock and formed by the birds into shallow bowls. This special nest was built entirely of fresh green material, and was, when first seen, a flat, scattered mass without any form whatever. It contained one egg, the bird probably having been ready to deposit it before the nest was completed. On several occasions single eggs were found where there were no nests. A few hours later this nest was visited and in the interim the bird had formed it into the usual shape. The nests built upon the ground were almost exactly like the rock nests. Those built on trees or upturned stumps, had a solid foundation of sticks and twigs, and surmounting this the usual form and make of nest. The tree nests are always placed on a flat branch or top of a spruce or fir, one of which was in one about twenty-five feet high; however, they are not common on Duck Island, there being only about a dozen.

The grass in many of the nests was dead and brown, but it is

not certain that it was so when first placed there, although it is probable that the larger portion is old grass. During incubation the weight of the setting bird breaks down or packs the nests, so they are continually being repaired and built up around the edges with new material, which is always green grass or weeds, the effect being very pretty indeed. On several occasions gulls were seen gathering this material in their bills. The grass is bitten off or pulled up by the roots until the bird has a ball in its bill larger than a man's fist. This material is gathered where it is most plentiful and is usually carried by flight to the nest site.

The bowl of the nest varies very little in size, but some foundations are larger than others, depending somewhat upon the location of the nest. The following measurements are of nests selected as good types :

No. 1. Depth of bowl, three inches; from top of nest to ground, ten inches; diameter of nest at top, ten inches, at base, twenty-four inches.

No. 2. Depth of bowl, three inches; from top to ground, five inches; diameter at top, ten inches, at base, eighteen inches.

No. 3. Depth of bowl, two and one quarter inches; diameter at top, nine inches, at base thirteen inches. This nest was built on the ground against a small side hill so that only one side had to be finished.

No. 4. Depth of bowl, two and one half inches; diameter at top, nine inches, at base fifteen inches.

Many other nests were measured and examined, and the average size of the bowl was found to be about ten inches in diameter and three inches in depth.

To obtain a fair average of the size of the eggs, measurements of fourteen sets were made as follows :

No. 1.	Set, 3	$2\frac{1}{8} \times 1\frac{5}{8}$	$2\frac{9}{16} \times 1\frac{1}{8}$	$2\frac{1}{8} \times 1\frac{1}{8}$
2	" 3	$2\frac{1}{8} \times 1\frac{1}{8}$	$2\frac{1}{8} \times 2$	$2\frac{1}{8} \times 1\frac{1}{8}$
3	" 1	$2\frac{1}{8} \times 2$		
4	" 3	$3 \times 1\frac{1}{8}$	$3 \times 1\frac{1}{8}$	$2\frac{1}{8} \times 1\frac{1}{8}$
5	" 3	$2\frac{1}{8} \times 1\frac{1}{8}$	$2\frac{1}{8} \times 1\frac{1}{8}$	$2\frac{1}{8} \times 2$
6	" 3	$2\frac{1}{8} \times 1\frac{1}{8}$	$2\frac{1}{8} \times 1\frac{1}{8}$	$2\frac{1}{8} \times 1\frac{1}{8}$
7	" 3	$2\frac{1}{8} \times 2\frac{1}{8}$	$2\frac{1}{8} \times 2$	$2\frac{1}{8} \times 2$
8	" 3	$3\frac{1}{8} \times 2$	3×2	3×2
9	" 2	$3 \times 1\frac{1}{8}$	$2\frac{1}{8} \times 1\frac{1}{8}$	
10	" 3	$2\frac{1}{8} \times 1\frac{1}{8}$	$2\frac{1}{8} \times 2$	$2\frac{1}{8} \times 1\frac{1}{8}$
11	" 3	$2\frac{1}{8} \times 1\frac{1}{8}$	$2\frac{1}{8} \times 1\frac{1}{8}$	$2\frac{1}{8} \times 1\frac{1}{8}$
12	" 2	$1\frac{1}{8} \times 1\frac{5}{8}$	$2\frac{1}{8} \times 1\frac{1}{8}$	
13	" 3	$3\frac{1}{8} \times 1\frac{5}{8}$	3×2	$2\frac{1}{8} \times 1\frac{1}{8}$
14	" 1	$2\frac{9}{16} \times 1\frac{1}{8}$		

It is remarkable how quickly the eye can detect any variation in the size of an egg, as by it the shape is entirely changed. The abnormal egg in set No. 12 was infertile. Capt. Stanley, head keeper of the lighthouse, was requested to watch the nest, and he reported later that the two eggs completed the set, and that the small egg did not hatch, but the other one did, bringing forth a healthy chick. Only three runt eggs were found among the 3500 or 3600 eggs in the two colonies.

The color of the eggs varied in a remarkable degree. The ground colors were light sky blue, dead blue, light blue-gray, light gray-blue, dark lilac gray, light gray, light pea-green, green drab, warm drab, ochre drab, pink drab, light brown, and cinnamon.

The colors of the markings were chocolate, brown, rich brown, light brown, snuff brown, asphalt, black, lilac, mauve. The shapes of markings were almost infinite,—large and small spots, indistinct specks, blotches, lines and irregular streaks, somewhat like the markings on the eggs of blackbirds. One egg was found with a light sky blue ground color with tiny indistinct specks of lilac and light brown. Some of the markings were so confluent that they resulted in a distinct ring around the egg.

Among the many hundred sets of eggs seen the usual number was three, rarely two, and more infrequently one. Only one set of four was found, which was on Heron Island, in Penobscot Bay; in other respects the set was normal.

Regarding incubation, Capt. Stanley pointed out the nest in which the first eggs were laid in the season of 1901, which were as yet unhatched; they were subsequently watched very closely, being visited a number of times daily. On Tuesday, June 18, in the afternoon, one of the eggs commenced to show signs of hatching; the shell was cracking about one inch from the large end. On Wednesday afternoon the cracked portion had broken open so that a part of the bill of the chick could be seen. The other two eggs had also become pipped or cracked. About 3 P.M. on Thursday the first bird was out of the shell and was not yet dry. It was a very weak and helpless object, so much so that it could not stand for more than a moment, when it would lie down, and even its head would be flat in the nest. On Friday morning, a little after

5 o'clock, we found the second chick, it having come out during the night. The first chick, however, was strong enough on our approach to run from the nest and hide under a nearby stump (Plate XXII). The oldest bird was placed in the nest again and the two photographed with the third egg, which was now so opened that the bill of the chick showed. When the young chicks are hatched the egg shell divides very evenly at the point where the bill of the young appears. The discarded shells are never found in the nest but are carried by the old birds some feet away. About the middle of the afternoon on Friday the third chick was hatched, thus making an interval of about twelve hours between the hatching of each egg. When the third egg had hatched the other two young birds were found hiding under nearby stumps, not to get out of the sun or cold, for it was a warm cloudy day. The instinct to hide seems to be developed within an hour or two after hatching, or so soon as the young bird is strong enough to walk. The young in tree nests also seem to have sense enough not to walk off the edge of the nest, for in 1902 Mr. Baily found young at least ten days old in a tree nest. The young when very small have a weak, peeping note that cannot be heard at any great distance; this seems, however, more a petulant cry for food than of fear or anger, for it is not uttered when the young chicks are handled, nor do they make any outcry then, even up to the time that they are large enough to fly a few feet; however, the young birds can protect themselves by giving very sharp bites with their bills: this seems to be their only method of defence prior to flight, except running and hiding.

The downy plumage of the young when three days old is as follows:

Under parts dusky white, running into gray on flanks and abdomen. A distinct triangle of light cream white on the centre of belly between breast and abdomen. Breast gray, throat and head cream gray with distinct tinges of buff. Back mottled light gray and dusky, getting more buff on head. Wings: scapular space buffy, primary space gray. The gray is also darker on tertial space on wings. On back the down is dark at the base, and grows lighter near the ends. The whole upper part of the bird is covered with dull black spots, irregular in shape. Bill horn black with pink tip, three-sixteenths of an inch long. Feet dusky pink, darker on edges and under portion.



Copyrighted, 1903, by W. L. Baily.

FIG. 1. YOUNG HERRING GULL, SIXTY HOURS OLD, SHOWING RAPIDITY OF GROWTH.



FIG. 2. YOUNG HERRING GULLS AND PIPPED EGGS.

The rapidity of growth of the chicks is very remarkable, and is illustrated in the accompanying photograph (Plate XXII), showing the comparative size of an egg and a chick sixty hours old.

On June 25, 1901, the young were hatching very rapidly; a superficial census was taken of a portion of the east colony, and ten nests with young were found. Capt. Stanley wrote under date of July 26, 1901, that "some of the young birds are flying over the rocks with the help of their legs for a kick now and then." These probably were those first hatched, which would indicate that they begin to fly in from thirty to forty days.

At the time of the 1902 visit hundreds of young were present; these, when approached, even from a great distance, all ran to hiding places under the long grass, logs, or bark, behind rocks, or wherever they could find a place to poke their heads out of sight. They are very easy to find, as some part of the body is generally in view. Sometimes four or five will be found under one fallen log or decayed stump. The parents are on the wing above as long as a person is in evidence, but on the intruder hiding for a short time, they settle down, one at a time, upon their favorite perches, on top of the trees or dead stumps, rocks, etc., and apparently after some vocal communication to their young, the latter begin to back out of their hiding places and strut about, picking at objects on the ground, and now and then chasing after their parents, squeaking for something to eat.

Regarding the food of the young birds but little evidence can be offered, but that is very direct and positive. Young birds on two occasions, when being handled, vomited their stomach contents, which were preserved in separate bottles with alcohol. Five samples of stomach contents were obtained in all, which were sent to the Biological Survey in Washington. Dr. Sylvester D. Judd, of that Department, furnished a report of his examination, which is as follows:

No. 1. *Larus argentatus*, Duck Island, June 22, 1901. Contents: Muscle, bones, scales, and digestive tract of a fish not more than 4 inches long, 100%. Total amount, 100% animal matter.

No. 2. *Larus argentatus*, Duck Island, June 23, 1901. Contents: 5 blow flies (*Calliphora vomitoria*), 25%; 3 moths, one of them a noctuid, 15%; 1 *Anisodactylus* (carabid), 5%; 1 *Leptura* (cerambycid), 5%; remains of a small fish 50%. Total amount, 100% animal matter.

No. 3. *Larus argentatus*, Duck Island, June 25, 1901. Contents; 17 *Calliphora vomitoria*, 40%; 1 weevil, 1%; 1 brown carabid beetle, 2%; 2 *Lachnostenra* (May beetles), 7%; remains of fish, 30%; vegetable rubbish 20%. Total amount, 20% vegetable matter; 80% animal matter.

No. 4. *Larus argentatus*, No-Man's-Land, July 4, 1901. Contents: 2 funnels and a propodium of squids about 4 inches long. Total amount, 100% animal matter.

No. 5. *Larus argentatus*, No-Man's-Land, July 4, 1901. Contents: Eye and epidermis of a very small squid, 25%; prosternal process of elaterid beetle, 20%; tibia of a May beetle, 30%; elytron of a carabid beetle, 25%. Total amount, 100% animal matter.

In 1902 Mr. Bailey observed the parents disgorge food on the ground which the young picked up and swallowed whole. The larger young will often tackle a squid, apparently several times too large for them, and after several unsuccessful attempts will worry it down, when the bird looks as though he were sorry and would like to change his mind. In some instances the parents seemed to exhibit very little judgment as to the ability of their young, and would leave a big, tough squid in the nest for a day old young one to devour. Several such were watched picking and pulling for some time without securing any nourishment. On visiting the nest a half hour later it seemed that the parent had also been convinced that her babies were not equal to the task and had removed the squid.

The mortality among the young varies. In 1900 the island of No-Man's Land was visited at the height of the breeding season when hundreds of young gulls of all sizes could be seen. Only a very few dead ones were found and they were generally those not more than three days old. In 1901 so few young were hatched on Duck Island, at the date the observations were ended, that no data could be obtained; however, No-Man's-Land was visited July 4, 1901, and it was found that from 60 to 70% of the eggs were hatched and that hundreds of young birds were hiding everywhere. A search for dead birds was made but very few were found. In 1902 Capt. Stanley reported that during the season about 200 young birds were killed by the adults, and nearly as many more were killed by sheep stepping on them, and others by being caught under rocks and brush where they go to hide.

In the report of stomach contents, that of No. 5 was taken from

a bird that was found dead. It was examined very carefully for wounds or any evidence of a violent death but none was found, and the conclusion must obtain that it died from some natural cause. The downy plumage of the bird was in such excellent condition that it was preserved, and it was found while skinning it that the body was very much emaciated, which would indicate death by starvation, although a small amount of food still remained in the stomach.

On Duck Island the remains of one young gull was found that had met a violent death; a small portion of the back, one foot, the tarsus and tibia, the stomach and a little of the viscera remained, the rest having been eaten. From the appearance of the remaining portions it was judged that the bird had been killed by a hawk, as it had been pulled apart; it showed no marks whatever of being chewed by a mammal. No hawks were seen on the island, although Capt. Stantley states that members of the hawk family often visit the island, especially during the migratory season.

The Captain also stated that the crows on the island destroyed some eggs, but he had never seen any evidence that they ever ate young gulls. He also stated that he was sure there were no four-footed enemies of the gulls, as he had made diligent search on the island for mammals and could never find the slightest trace of any. He had carefully looked for tracks in the snow many times but always without success. The Captain also says that the old birds sometimes kill the young. The adult seems then to exhibit great anger and strikes the victim with its bill until it is dead. In all probability the one killed is not its own offspring, for it seems impossible that any bird that exhibits the solicitude for its eggs and young that the Herring Gull does could become an infanticide. In 1902 Mr. Baily saw an old bird actually striking the head of a young bird about ten days old, while the helpless little fellow, with quivering wings, implored the old one to stop. But with only occasional pauses he continued the torture, just as a cat does before eating a mouse. Then he would strike his victim in the back pulling out its half-grown feathers. The blows came harder and harder, and when the poor thing collapsed, the old bird walked away a few feet and uttered the worst noise he was

capable of, but returned to finish his work at the sound of a last weak cry. A few minutes later another old bird faced the murderer, and they cursed one another for all they were worth, but no attempt was made to strike. What the relation was between the three parties could not be determined, nor could it be surmised why the real parent, or some neighbor, did not interfere and prevent the tragedy. However uncommon this occurrence, it was not unique, for at least six dead birds were found in various places, all of about the same age, which had been dealt with in a similar manner, their heads, backs and wings being bruised and blood-stained. Nothing deformed or unhealthy about these birds was noted and no solution can be suggested, unless it be that the young birds were lost and were put to death by old birds who objected to being pestered for something to eat by other people's children.

Great opportunities for the study of the habits of the adult gulls were offered on Duck Island and some interesting facts were observed; among these was evidence that both the male and female parents take part in the incubation of the eggs. On one occasion, while photographing gulls on nests, it was noted that the first bird that occupied the nest, after the camera was focussed, had a number of dark feathers on its breast; after it had left the nest a bird with a pure white breast occupied it. That this was a mated pair there is no reason for doubt, for they were together, and both exhibited the greatest solicitude for the nest and its contents. It was also observed that as the period of incubation neared its end the anxiety of the parents increased in a marked degree, so that it was easy to determine the stage of incubation by the actions of the parents. During the last few hours before the pipping or cracking of the egg the parent birds were so fearless that they would leave the nest only on a near approach, and while the camera was being focussed would remain within a few yards, perched either on the ground or a low tree or stump. Exposing the plate was always made with a bulb at a distance of forty to sixty feet, and before it could be reached one of the parent birds was sitting on the nest again. In such a case as this it was not necessary to cover the camera at all; on the other hand, if incubation had not advanced so far, it was neces-

sary to cover the camera in the most skillful manner or else wait for hours before the gull would return to the nest. On sunny days during the hours of greatest heat, say from 12 to 3 P. M., the nesting gulls were not so anxious to remain on the eggs, nor did the eggs cool enough to do them harm.

Mr. Baily, in 1902, built a blind of sticks, old ship trash, etc., about ten feet from a nest containing three eggs. While inside he seemed to be entirely forgotten by the birds, for in less than five minutes a bird alighted on top of the blind, which must have been placed near its favorite perch. In about ten minutes the owner of the nest was noted standing about thirty feet away, suspiciously eyeing the hut, but before long she cautiously but proudly marched to the nest. In her bill was a bunch of dry grass which she deposited on the side of the nest, which was placed in the green grass and clover against a small log. For several hours the nest was watched and on two occasions of the seven when the bird returned to the nest she turned the eggs slightly. They had previously all been marked with an arrow pointing in one direction, and it was found she had only turned one of the pipped eggs. She did not seem at any time to make any examination of the eggs, but turned them with her bill after she had nestled down into position. She always alighted some little distance from the nest, and after looking about to see if the coast was clear, walked rather deliberately to the nest, and carefully, tenderly sank into it, moving her body from side to side about six times, as if to work the feathers between the eggs; she then sat with her head erect, turning it to the right or left every second or two, watching all that was going on about her. Her mate was continually on guard about fifteen feet away, sitting on a fallen log.

A high temperature seemed to have a marked effect on the gulls, for it was noticed that they kept their mandibles open and the tongue raised as if in distress for air. This was observed both with the setting gulls and those that were perched about on the trees and rocks. The calls and cries of the adult were very varied and seemed to fit each occasion. On our entering one of the colonies, all the nearby birds would rise into the air, each one screaming *Kak-kak-kak* at the top of its voice. As the intruder advanced further into the colony the number of

screaming birds increased until there was a very babel of sounds and a whirling mass of birds in the air, flying in graceful evolutions. As the observer advanced further into the colony, those first disturbed gradually settled down and resumed their wonted occupations of nesting or watching. If a pause was made to examine or photograph a nest, and the observer bent low and remained still, nearly all of the excited gulls immediately dropped to the ground and resumed nesting or watching, and the colony became as quiet as when there was no intruder in it, excepting, of course, the very few birds that belonged to the immediate neighborhood of the nest under examination. The light-keepers insist that the gulls know all the regular residents of the island, some ten in number, and do not exhibit as much fear or excitement when they visit the colonies as when strangers do. They also believe that the gulls soon become used to persons; in other words, learn to recognize them, and consequently cease to fear them. They certainly exhibit a very pleasing confidence in the residents of the island, for nine nests were found in the light-house reservation not many yards from the dwellings of the keepers. The remarkable tameness of the gulls on Duck Island and No-Man's-Land was one of the most pleasing features of the visits to these colonies, and it can be accounted for only by attributing it to the protection given to the gulls on these islands: they certainly recognize the fact that they are not molested, and exhibit a charming confidence in man.

The breeding of these gulls in colonies shows the social side of their nature, which is very strongly marked. Their nests are placed very close together, in some instances, and quarreling among the setting birds seems to be unknown.

The gulls all have their favorite perching places near the nests, and if some other gull happens to alight upon it there is usually a slight skirmish, but the intruder has no chance to maintain his position. The perch is always upon such a small limb or point of a dead stump that the slightest push or even a strong gust of wind will cause a loss of balance, and a short flight has to be taken before the position can be resumed. When the usurper occupies such a perching place, the rightful owner has only to fly behind him and give a push with his breast and the perch is

vacated. There is rarely any resistance, this seeming to be the lawful method of dispossessing an intruder. The quality of bravery is not lacking in the character of the gulls, especially when they have young; they are then extremely solicitous and do not hesitate to make demonstrations of attack by assault. On one occasion Mr. Dutcher, after photographing a nest, sat down on a nearby stump to make some notes, not noticing that there was a nest with some young birds at the back of the stump. This action on his part seemed to excite the parents to an unusual degree, for they made repeated swoops at the intruder, passing within a short distance of his head each time. Gradually they became more angry, until finally one of the gulls struck his head a sharp blow with its wing.

The tameness and confidence in man displayed by the gulls on Duck Island and No-Man's-Land was not shown by the gulls on any of the other islands visited; this may be accounted for by the fact that the protection given was not so complete, and also that where the colonies are large the birds give each other courage; in other words, they appear to think "there is safety in numbers."

The gulls do not seem to be disturbed by mammals to any great degree. The sheep that feed on the islands sometimes wander among the nests, but the setting birds make no further demonstration than to rise on the nest and show a bold front to the sheep, which always turn away. On one occasion a low rock, almost awash, was seen on which some thirty or forty gulls were standing, and among them were five or six harbor seals. The rising tide reduced the surface of the rock rapidly, thus crowding the occupants together, but the utmost harmony prevailed.

In 1902 Mr. Baily observed some sheep approaching a nest; the setting bird watched them with considerable anxiety, and occasionally uttered a low *chuck*, which grew louder as the half-dozen sheep gradually and heedlessly neared the nest, nibbling the clover. When within about three feet she opened her mouth and uttered a strong protest, which caused the sheep to raise their heads in slight alarm, and finally, at her wits end, she raised up on her feet and invoked the aid of her attentive mate, who, screaming at the top of his lungs, dashed into the faces of the unsuspecting intruders and scattered them into a stampede up the slope. Not long

after, one of them, blindly following his nose, wandered into the same tracks, but when within a few feet of the nest his course was altered after a slight protest from the occupant of the nest.

The sanitary habits of the gulls are excellent; they are very fond of bathing, resorting to the ocean where it is smooth, outside the surf line. There numbers of them gather and rest on the water, dipping their heads under, and throwing it over them in showers. Then follows a period of dressing and preening the feathers. Among the thousands of birds seen this season, not a single individual was noted that showed the slightest stain on its beautiful white plumage.

The mortality among the adult gulls on the breeding grounds seems to be small. In 1901 only four dead ones were found; one of these had evidently been shot at from some passing vessel while off shore feeding and had strength enough left to fly to its home to die. The other three had died from some accidental cause. Capt. Stanley states that gulls are sometimes killed by flying against sharp pointed stubs, thus receiving a fatal wound, and on one occasion he had found the skeleton of one that had been caught by its leg in the crotch of a limb and had starved to death. In 1902 he reported 25 old birds killed, most of them being accidentally caught on trees. At daylight large numbers of gulls leave the island and go to sea for food; and the length of time they remain away is governed probably by the distance they have to go to find fish. Some days they return quite early and on others much later. The manner of flight when returning from one of these food trips is entirely different from that of the ordinary excursions made from the breeding grounds; it is made close to the surface of the water, very direct, one bird following another, and is quite rapid. Sometimes the birds show marked evidences of fatigue. Capt. Stanley states that the gulls are great gluttons when food happens to be very plenty, for he has seen them eat so much that it was impossible for them to fly but a short distance. They have the power of disgorging, both pellets and partially digested food: many of the former, composed of fish bones and scales, were found, and on more than one occasion the observers just escaped a shower of half digested fish that was disgorged by an overloaded or excited gull. They are very fond of codfish.

livers and can be tolled up with them very close to a boat. Should a liver sink before it can be picked up by a gull while hovering, the bird will settle on the water and disappear under the surface in the effort to obtain the coveted tidbit.

The following special report was received from Capt. William F. Stanley, September 23, 1902.

"The first flight of Herring Gulls, about 800, arrived at Great Duck Island, March 12; their numbers steadily increased until the 20th of May. The first egg was found May 15, and the first completed set of three eggs on May 22. The last set of eggs hatched August 3-5. Fifteen nests were marked and watched in order to determine the time occupied in incubation, which proved to be as follows: 1 in 24 days; 2 in 25 days; 5 in 26 days; 4 in 27 days; 3 in 28 days. Young birds were about five weeks old when they began to fly. September 16 all the old birds left the island, leaving the young birds to care for themselves."

A NEW SUBSPECIES OF NIGHTHAWK FROM THE BAHAMA ISLANDS.¹

BY J. H. RILEY.

THE nighthawk of the Bahama Islands has generally been recorded as *Chordeiles minor*, but while collecting birds, in conjunction with Mr. S. H. Derickson, on the Geographical Society of Baltimore's Bahama Expedition, we managed to secure a small series of these birds. A comparison of this material with a series of *Chordeiles virginianus minor* from Cuba and the Isle of Pines, and with *Chordeiles virginianus chapmani* from Florida, proves the Bahaman bird to be a well-marked geographical race. As it is apparently without a name it may be known as:

¹ Published here by permission of the Secretary of the Smithsonian Institution.

Chordeiles virginianus vicinus, subsp. nov.

Type, No. 189689, U. S. National Museum, ♂ ad., Long Island, Bahamas, July 16, 1903. Collected by J. H. Riley (Orig. No. 183).

Similar to *Chordeiles virginianus chapmani* but smaller, with the crissum and abdomen suffused with buff and the white patch on the primaries smaller.

Measurements of type; wing, 176.5; tail, 100.5 mm.

Female similar to the male, but buff of abdomen and crissum deeper; white of throat less pure and more restricted; and the white terminal bar on the tail nearly if not quite obsolete.

Distribution.—Nighthawks were either taken or seen on the following islands by us: New Providence, Andros, Eleuthera, Watling's, and Long Island. They have also been recorded from Great Bahama, Abaco, Fortune Island, Acklin Island, and Great Inagua, and are probably found during the breeding season throughout the Bahama group of islands.

Remarks.—While in size the Bahaman Nighthawk is about equal to *C. v. minor*, in color it more nearly resembles *C. v. chapmani*, but whereas the latter has the crissum and abdomen nearly pure white barred with black in *C. v. vicinus* they are suffused with buff. *C. v. vicinus* differs from *C. v. minor* of Cuba in lacking the tawny mottling above and the ochraceous-buff below, the latter color being represented in *vicinus* by the buff wash on the abdomen and crissum. In fact, the Bahaman bird is intermediate in color between the form found in Cuba and the one in Florida, with a leaning towards the latter.

Three males of *C. v. chapmani* from Florida average: wing, 186; tail, 100.5 mm.

Four males of *C. v. vicinus* average: wing, 169; tail, 93.5 mm.

Six males of *C. v. minor* from Cuba and the Isle of Pines average: wing, 170; tail, 94.5 mm.

Habits.—These birds would come out early in the evening and hawk about for insects in the same manner as *C. v. virginianus* in the North, but it seems to be more of a day flyer than that form, as they could frequently be seen flying about in the heat of the mid-day sun, in this respect reminding one of *C. v. minor* of Cuba. The note resembles that of the latter bird also and it gets the native name of *pick-a-me-dick* from its call given while flying. They are said not to be permanent residents on the islands, but to come from the south in the latter part of April.

Dr. Coker gave me an egg, with incubation nearly complete, found by flushing the parent off the nest, July 11, on Watling's Island. He also showed me a nest on Long Island, July 17, containing one young in the down on which the feathers had just begun to grow. In both cases there was no nest other than a slight hollow in the little sand that had collected in the cavities of the rough coral rock of the beach.

The egg has a slight greenish-white ground color with larger and smaller spots and blotches, which run together at the larger end to form an indistinct wreath, of lighter and darker shades of plumbeous. Over this there are small streaky spots of raw umber, evenly distributed over the shell. It measures 23.4 × 12.5 mm. In color it is exactly intermediate between eggs of *C. v. minor* and *C. v. chapmani*.

GENERAL NOTES.

Sabine's Gull at Monterey, California.—While carrying out a line of work for the Field Columbian Museum, last April in the vicinity of Monterey, Cal., I came across a small bunch of Sabine's Gull (*Xema sabini*) in perfect spring plumage. They came into the Bay with hundreds of Bonaparte Gulls and Red Phalaropes after a storm of a week's duration.—**GEORGE F. BRENINGER, Phoenix, Arizona.**

The Snowy Plover in the Bahamas.—Mr. S. H. Derickson shot a specimen of *Ægialitis nivosa* on Long Island, Bahamas, July 16, 1903. It was in the company of another of the same species, he tells me. This is the first record of this species, I believe, for the Bahamas. The specimen is now in the U. S. National Museum.—**J. H. RILEY, Washington, D. C.**

Richardson's Owl (*Nyctala tengmalmi richardsoni*) in Illinois.—In recording the second capture of this owl for the State, I mentioned¹ that another specimen had been reported, but that I was then unable to get

¹Auk, Vol. XX, p. 305.

any definite information as to locality and date. Through the kindness of Mr. Frederick C. Pierce of Chicago I am now enabled to record a third specimen which was taken in Cicero, in December, 1902, and is now in his possession.—RUTHVEN DEANE, *Chicago, Ill.*

Capture of the Barn Owl (*Strix pratincola*) on Long Island, New York.—This species is sufficiently rare on Long Island to make it worth while to record a specimen shot February 17, 1903, at Montauk Point. The bird was sent to me by Mr. Everett C. King, who wrote that it had been seen flying about for two or three days after a hard snow storm. He also stated that this bird and one shot two years ago are the only ones of the kind he has seen in eleven years.—JONATHAN DWIGHT, JR., M. D., *New York City.*

The Second Known Specimen of *Centurus nyeanus* Ridgway.—On landing at Cockburn Town, Watling's Island, Bahamas, July 11, 1903, in company with Mr. S. H. Derickson, being very desirous of obtaining reliable data as to the status of the above species (*cf. Nye, Auk, XVI, July, 1899, 273*), we struck out to find timber and arrived on the shores of the first lake about a mile back of the port. This lake and the large lake connected with it are surrounded with low hills, covered with a low growth of trees, where they have not been cleared for sisal planting. While standing talking with Mr. McDonald, the resident justice, concerning woodpeckers and being told that he had never seen one there during a six months' residence, we heard a note resembling the rolling call of the Belted Kingfisher and supposed it was that bird. In a little while the bird flashed across the road and lit in a rather thick clump of trees out of sight. On going back to shoot the supposed kingfisher what was my surprise to behold the very species I was looking for. It is now No. 189685, U. S. National Museum, ♂ ad. The specimen is in worn plumage and hardly comparable with the type. While the top of the head in the type is a brilliant scarlet-vermilion, my specimen has faded out to an orange-vermilion; the feathers covering the nostrils in my specimen are less extensively scarlet, and the lower parts so worn as not to be comparable. It measures: wing, 129; tail, 88; exposed culmen, 32 mm. We were told that these woodpeckers, while not at all common, came down from the hills during the winter and did considerable damage to the oranges by making a small opening in the side of the fruit and extracting the pulp. We were shown orange trees in which nearly all the ripe fruit was thus destroyed, some of it still hanging on the trees. Although we made special efforts to secure additional specimens, during our limited stay, we did not hear or see any more.—J. H. RILEY, *Washington, D. C.*

Nighthawk Migration in New Hampshire.—One of the most interesting regular migration movements that has come under my notice I have

observed at Lake Pasquaney, Bridgewater, N. H., for the past three years. On August 25, 1900, Mr. G. M. Allen noted in the records of Camp Pasquaney twelve Nighthawks (*Chordeiles virginianus*); the most seen on any date that summer. In 1901, on August 22 and 23, I recorded a large flock, over twenty-five birds each day, passing at sundown slowly to the southwest over the lake. On August 22, 1902, at dusk, a flock of fully three hundred were seen migrating in the same direction. Again this year, on August 22, 1903, in the forenoon, nearly a hundred birds were noted passing over to the southwest. Thus for four years a definite migratory movement of these birds in considerable numbers has been observed between August 21 and 25. This migration has been noticed in Saco Valley, and I take it the birds passing over Pasquaney are stragglers from the Pemigewasset Valley migration, which occurs regularly.—REGINALD HEBER HOWE, JR., *Concord, Mass.*

Nests and Eggs of *Cœligena clemenciae*.—About July 7, in the Huachuca Mountains, Arizona, I discovered a Blue-throated Hummingbird beginning its nest on a shelving rock on the face of a cliff. On the 13th the first egg was laid and on the 15th I took the set of two eggs, nest, and female parent. A single small fern was the only vegetation growing within ten or twelve feet of the nest. The rocks above the nest projected well out from the nest, protecting it from the torrents of rain that falls at that time of the year. The nest was composed chiefly of down from the under side of sycamore leaves, some cocoons and green moss, all firmly bound together with spider webs. The female when started from the nest, instead of flying directly out from the nest and away, would fly straight up the face of the cliff and pass through a rift in the wall. A great fondness is shown by this species to associate itself with rugged places.

This set of eggs, so far as known, is the third in existence. E. W. Nelson speaks of a nest from which a single egg was secured, built in a shrub up on the side of the Vulcan de Tuluca, Mexico. Josiah H. Clark (Auk, XVII, July, 1900, p. 294) tells us of a set of eggs taken by himself in the state of Vera Cruz, Mexico. In 'The Osprey' for February, 1899, I described a nest with two eggs I took on May 31, 1897, in these same mountains, built in a clump of maiden-hair ferns growing from the side of a wall of rock—the side of a deep gorge. The set of eggs taken this year is now in the collections of the Field Columbian Museum.—GEORGE F. BRENNINGER, *Phoenix, Arizona.*

Mortality of Purple Martins (*Progne purpurea*) at Brattleboro, Vt.—During the long rain in June, 1903, the nests in the bird house belonging to William C. Horton of Brattleboro, Vt., became completely watersoaked, and thirty young and two adult Purple Martins were found dead in their nests. The remaining members of the martin colony abandoned the

house, leaving twelve eggs unhatched. Occasionally a few return and fly about as if trying to catch a glimpse of the inside of their home but none have ventured to enter up to this date (July 17).—FRANCES B. HORTON, Brattleboro, Vt.

Sand Swallows (*Riparia riparia*) Nesting in Sawdust.—In the summer of 1902, while I was in Franconia, N. H., Mrs. Annie Trumbull Slosson pointed out to me a pile of sawdust, on the perpendicular face of which, earlier in the season, she had noticed what seemed to be entrances to Sand Swallow nests. The pile is constantly being shovelled away, and at the time of my visit no holes were visible.

This year (1903) Mrs. Slosson wrote me, under date of June 18, that she had been out to the place (on the Easton road) two days before, and seeing a hole in the vertical (newly dug down) side of the sawdust heap, had taken pains to investigate the matter.

"We sat in the carriage," she wrote, and watched the hole, and soon saw a swallow enter it and, immediately after, another. They came out, flew away, and returned, entering the hole again. Each time they went in little clouds of sawdust puffed out like smoke. I got out of the carriage and went up the mound to the hole. I put my hand and arm in as far as I could, but it was not far enough to reach eggs or young, and I was afraid of the mound's coming down upon me. After I returned to the carriage the birds came back, but were very shy of going into the disturbed hole, making several starts, vibrating their wings, then flying away. But in a few minutes they gained courage and again entered the hole. I think there is not the slightest doubt that it is their home. I could find no other hole, but have little question there were others which had been wrecked by the workmen, who had been digging down that side of the pile."

Some days later she wrote: "On Saturday we drove again by the sawdust heap. There were full twenty holes, and apparently all were occupied; swallows flying in and out all the time, a regular colony, just as you see them in a sand-bank. Poor simple creatures, I fear an earthquake—or dustquake—has even now destroyed their work."

I begged her to make absolutely sure of the species, if she had not already done so, though really there could be no reasonable doubt upon that point, and on June 25 she replied: "Well, the species is all right. I verified things yesterday. We went out to the mill, and I went up the steep, sliding mass to the holes, 'where the swallows dustward fly.' About half a dozen of the holes had disappeared, but there were fourteen left. The birds, came about me, and I easily identified them as Bank Swallows, with white throat and a dark band across the breast."

Whether the breeding of Sand Martins in sawdust heaps has ever been recorded I do not know, but the occurrence seems to me of considerable interest, especially because the Sand Martin is the one member of its

family, as seen in eastern North America, that I had supposed never to have altered its manner of life as a result of what we call civilization.—
BRADFORD TORREY, *Wellesley Hills, Mass.*

An Interesting Solitary Vireo (*Vireo solitarius*).—On April 28, 1903, a male Solitary Vireo appeared in our garden; this, although situated in a thickly settled part of Cambridge, more than a mile from the nearest woods, covers upwards of an acre of ground and contains, in addition to much dense shrubbery, a number of well-grown trees of various kinds, including a few pines, spruces and hemlocks. The bird evidently found the place to his liking, for he remained there during the whole of the following three months, spending most of his time in the garden but also ranging through the cultivated grounds which surround the houses of our nearer neighbors. So far as we could ascertain he had no mate, although it is possible that he built a nest, for on one occasion late in June he was seen tearing strips of loose bark from a birch and taking them into the trees on the opposite side of the street.

That so notorious a forest lover as the Solitary Vireo should ever choose for his summer home a city garden, however wild and primitive, is sufficiently remarkable, but a still more interesting characteristic of this particular bird was that he had two perfectly distinct songs, one typically that of his own species, the other absolutely indistinguishable from that of the Yellow-throated Vireo. These, although used with about equal frequency, were never confused or intermingled. He would sing one for minutes at a time and then take up the other for a longer or shorter period. Not once when I was listening to him did he interpolate any of the notes of either strain among those of the other, nor ever change from one to the other save after a well marked interval of silence. To the ear of the listener, in short, he was either a Solitary or a Yellow-throat, as the mood happened to serve, but never both in the same breath.

When rendering his own legitimate theme this bird was as typical and fine a singer as any Solitary that I have ever heard. Indeed, he appeared gifted to a really exceptional degree with the wild, ringing quality of voice, the generous repertory of varied, exquisitely modulated notes, and the (at times) rapid, ecstatic delivery which combine to make the song of the Solitary so delightful to all discriminating lovers of bird music. But when, on the other hand, he chose to play the rôle of his yellow-throated cousin he reproduced with equal fidelity and success the latter's characteristically slow, measured delivery and rich contralto voice. So perfect, indeed, was the imitation that when, as repeatedly happened, I had opportunity for directly comparing it with the song of a true Yellow-throated Vireo that also frequented the garden, I was unable to detect any differences whatever in the notes of the two birds.

It may be well to add in this connection that Mr. Walter Faxon has heard one Yellow-throated Vireo (in Waltham, Massachusetts) and another (in Lancaster, Massachusetts) which sang almost exactly like a

Solitary Vireo; in both of these instances, however, the bird, unlike the Solitary above mentioned, appeared to use only the song which it had borrowed from its near relative and to have either lost or never acquired that of its own species.—WILLIAM BREWSTER, *Cambridge, Mass.*

Bell's Vireo (*Vireo bellii*) in Colorado.—It may be of interest to record that the writer shot a male Bell's Vireo, June 12, 1903, on Clear Creek, near Denver, Colorado. In his second appendix to the 'Birds of Colorado,' Prof. W. W. Cooke intimates the future discovery of the species in the State, and so far as I know this is the first taken in Colorado. The bird was first discovered by hearing its unfamiliar song, but I feel quite certain I have heard the same song in the city, on one or two occasions in previous years. The specimen is now in the collection of the State Historical and Natural History Society, Denver, Colo.—HORACE G. SMITH, *Asst. Curator, State Historical and Natural History Society, Denver, Colorado.*

Nest and Eggs of the Swainson's Warbler (*Helinaia swainsonii*).—June 1st and 8th were 'red-letter' days for me from an öölogical standpoint. Jumping on my wheel and riding two or three miles from this city, I came to a swamp I had never visited before; and while looking carefully among the thick cane-brake, I heard *chipps* of a warbler. Birds were singing and darting all around, and the 'swamp-flies' were making my life miserable, when I perceived a bunch of cane-leaves near the top of a cane-bush seven feet above the ground. On going closer, I saw a warbler on the nest, which immediately flushed and feigned lameness, rolling and chirping on the ground among the cane. I at once recognized the bird as Swainson's Warbler, and on peering into the nest saw, to my great delight, three white, unmarked eggs of a slightly pinkish hue and rather globular in shape. The nest was a typical warbler's, being made of leaves of the elm, cane in layers, pine needles, and lined with fine rootlets and grasses. I at once packed the eggs with the enthusiasm of having found such a rare nest—the rarest eggs I have ever found in this locality. Having read that this species of warbler nests in small colonies, I continued in the cane, stooping often to search the tops of the cane. I had not gone ten feet, when I came to another nest with a warbler on it, in a cane-bush situated five feet above the ground. The bird dropped and fluttered off. The nest was more compactly built and contained three fresh eggs, somewhat smaller than the eggs of the other set. Proceeding near the end of the cane-brake, I saw a warbler dart out from a clump of cane, and on investigating, I saw a neat little Hooded Warbler's (*Wilsonia mitrata*) nest with three creamy white eggs marked with specks and spots of chestnut and lilac gray wreaths. I found one uncompleted Swainson's Warbler's nest, and on visiting the same swamp again in a week, I located two more sets of three eggs each of this

warbler—the rarest of southern warblers.—Dr. M. T. CLECKLEY,
Augusta, Ga.

Springfield, Mass., Bird Notes.—*Branta bernicla*. On the 11th of April last a Brant was taken on the river near Northampton; this bird is rarely observed in this part of the Connecticut Valley.

Aquila chrysaëtos. In November, 1902, a Golden Eagle was captured alive in a steel trap at Belchertown by Edgar E. Mead; the bird is now in captivity in the city park in Springfield. There is no other record of the appearance of an individual of this species near here for more than twenty-five years, and there are only three instances recorded previous to that time.

Lanius ludovicianus migrans. A Migrant Shrike was taken at Longmeadow Dec. 19, 1901.

Podilymbus podiceps. In this section of the country the Pied-billed Grebe has been a rare breeder, usually locating its nest in remote places away from the habitations of man. In the spring of this year, a pair chose as their home a small pond in the suburbs of Springfield near a number of houses, and at a place which was a rendezvous for boys, and there nested and succeeded in raising two young.

Branta canadensis. For more than ten years Canada Geese have been successfully bred in the public park, in Springfield, and until last year, one of the wings of each of the young has been cut to prevent their flying, but last autumn about twenty-five individuals of those raised during 1902 were left uncut. In the early spring of this year these birds became very noisy and uneasy and beginning with short flights soon would go off for many hours. Several are known to have been killed, and others disappeared, probably joining migrating flocks. Although the path to the regular breeding grounds of its kind, to the north, was free for it to follow, one preferred to return to the park and there mated with one of those with a crippled wing, and the pair successfully raised a brood of young.—ROBERT O. MORRIS, *Springfield, Mass.*

Some New Records for Nova Scotia.—Among a small lot of bird skins sent to me from Sable Island, Nova Scotia, by Mr. Jas. McL. Boucher, I find no less than five species that are new to the Province and two others whose presence is purely accidental although previously recorded. Almost without exception the birds are young of the year, which goes to prove that young birds are most frequently lost, and as all of them were captured in the fall, it is extremely probable that they were carried along far out of their bearings by autumnal storms. It is well established that most accidental visitors in the East are taken in the fall, and the movement of storm centres in a northeasterly track east of the Mississippi undoubtedly has a close bearing upon such captures.

Geothlypis formosa. **KENTUCKY WARBLER.**—A young male taken

September 1, 1902, is in first winter plumage as determined by softening the skin and examining the bones. The nearest point at which the species regularly breeds is New Jersey.

Chondestes grammacus. LARK SPARROW.—A young male taken September 4, 1902. This bird, still showing remains of the juvenal plumage, had wandered at least a thousand miles from where it was probably hatched in the Mississippi Valley.

Spiza americana. DICKCISSEL.—A young male in first winter plumage taken September 13, 1902. Another wanderer from the Mississippi Valley, perhaps.

Hydrochelidon nigra surinamensis. BLACK TERN.—A young male in juvenal plumage taken September 9, 1902. This species has been so often recorded along the New England coast that its occurrence at Sable Island is not unexpected.

Micropalama himantopus. STILT SANDPIPER.—An adult female, secured August 18, 1902, seems to establish a first record for Nova Scotia.

Icterus galbula. BALTIMORE ORIOLE.—A young male in first winter plumage, taken October 4, 1902, is the second only that has been recorded (see Auk, IV, 1887, p. 256, for earlier record) and Mr. Bouthier comments that it "came during a heavy gale."

Mimus polyglottos. MOCKINGBIRD.—A young male in juvenal plumage was captured September 3, 1902, "hopping about a woodpile." It is the second from Sable Island (see Auk, XIII, 1896, p. 344) in this plumage.—JONATHAN DWIGHT, JR., M. D., *New York City*.

Formalin Fails as an Insecticide for *Dermestes*.—Wishing to test the efficacy of this chemical which has been advocated as a protection against 'moths,' I placed five larvae of *Dermestes* and a couple of teaspoonfuls of Schering's formalin in a new nearly air-tight 'Cambridge bird-can' leaving it closed for twenty-four hours. On opening the can I found the formalin had not entirely evaporated while the larvae were unharmed. They had run about freely in the can and quickly revived in the fresh air. Even a bath in the liquid produced no permanent ill-effects, so the next day they and five more of their brethren were again placed in the can and a teaspoonful of carbon disulphide poured in. When the can was opened at the end of only ten hours, the larvae lay dead in the little tray in which they had been placed. Although extremely offensive to the nose and dangerous because volatile and inflammable, there is no surer insecticide than the disulphide. It is penetrating and destroys life even in the eggs of 'moths' of all kinds, and its bad odor is offset by its rapid evaporation. Formalin is constantly irritating to nose and eyes and if, as I have shown, it fails to promptly destroy one of the naturalist's greatest enemies its use even as an insectifuge is not to be encouraged.—JONATHAN DWIGHT, JR., M. D., *New York City*.

RECENT LITERATURE.

Macoun's 'Catalogue of Canadian Birds,' Part II.—The first part of this important work appeared in 1900, and its general character and scope were so fully indicated in this journal (Vol. XVII, Oct., 1900, pp. 394, 395), that it remains now only to chronicle the appearance and extent of Part II,¹ which includes the Raptoreæ, and the succeeding families of the A. O. U. Check-List to and including the Icteridæ. As in Part I, we have a compendium of the previously published information regarding the range and breeding areas of the species known to occur in North America north of the United States, supplemented by a large amount of hitherto unpublished material gathered by the members of the Canadian Geological Survey, and contributions from a large number of trustworthy correspondents. The authority is given for each record, whether published or unpublished, thus explicitly designating the sources of the information here presented. In the case of published records, the place of publication is often, but not always, explicitly stated. The 'Catalogue' also includes a list of the specimens in the Government Museum at Ottawa, with full data as to their place and date of capture, etc.

It is announced that Part III, completing the work, is ready for the press, and that it will be published during the coming winter. It will include such information relating to species mentioned in Parts I and II as may have been received since their publication, as well as an index to the three parts, and a complete bibliography of the authorities consulted in the preparation of the work. The 'Catalogue' will thus be a work of great permanent value, and a most important contribution to our knowledge of the distribution of North American birds.—J. A. A.

Dresser's 'A Manual of Palæarctic Birds.'²—In a work of some 950 pages Mr. Dresser manages to treat the 1219 species and subspecies of the

¹ Geological Survey of Canada. | Robert Bell, M. D., Sc. D., (Cantab.), LL. D., F. R. S. | — | Catalogue | of | Canadian Birds. | — | Part II. | Birds of Prey, Woodpeckers, Fly-catchers, | Crows, Jays and Blackbirds. | Including the following orders: | Raptoreæ, Coccoyges, Pici, Macrochires, and Part | of the Passeres, | — | By | John Macoun, M. A., F. R. S. C., | Naturalist to the Geological Survey of Canada. | [Vignette.] Ottawa: | Printed by S. E. Dawson, Printer to the King's Most Excellent Majesty, | 1903.—8vo, pp. i-iv, + 1l., pp. 219-413. Price, 10 cents.

² A Manual of | Palæarctic Birds | By H. E. Dresser, F. L. S., F. Z. S., etc. | Author of "The Birds of Europe" | [Vignette] London | Published by the Author at 3 Hanover Square, W.—8vo, Part I, 1902, pp. 1-498, and frontispiece; Part II, 1903, pp. i-vii, 499-922, 8ll. unpaged, and frontispiece. Price, 25 s. net; thin paper copies, 30 s. net.

Palæarctic ornis, as here recognized. As stated in the preface, the work is "primarily intended for the use of field-naturalists and travellers." With their convenience in mind, the technicalities, including synonymy and references, have been reduced to small compass, and binomials are employed throughout, even for the forms included as "subspecies." All forms "described under trinomials" have been uniformly excluded as not entitled to any kind of recognition, for the reasons, first, that the author is "in principle a binomialist," and, second, because their recognition is difficult for even experts, and their admission "seems calculated rather to puzzle and discourage than to assist the beginner." For this and other reasons the 'Manual' can hardly be considered as a technical treatise, but as a popular handbook for the identification of the species and the more prominent "subspecies." The nomenclature is orthodox from the standpoint of ultra conservatism, through the non-recognition of Linnaean names proposed prior to 1766, in the rejection of specific names that have been adopted for genera, and in the use of emended forms of names instead of the original. To save space in the bibliographical citations, apparently, the name adopted in the text heads the list of references, regardless of whether the generic element of the name was used for the species by the authors cited or not; but when not so used the name of the author is enclosed in parenthesis, though there appears to be no explanation to this effect. It also seems a little strange to find a species ranged as a subspecies of some other species described many years later, as in the case of *Cinclus aquaticus*, with parallel cases elsewhere.

In the treatment of the species the English name is given first, then the systematic name, followed by references to the principal works treating of the species (or subspecies, as the case may be); then are given its vernacular names in the various countries it inhabits, followed by a short description (generally sufficient, apparently, for identification), a brief statement of its range, and a paragraph or two regarding its habits, including some account of the nest and eggs, the whole occupying about a page. Subspecies are formally distinguished as such by the prefix "subsp." and by use of different type for the name; they are usually disposed of, very properly, in a few lines, by comparison with the species to which they are most allied. The species follow each other in the systematic order of the same author's 'Birds of Europe,' but there are no divisions higher than genera to indicate the limits of families and orders — a feature that might well have been supplied in the interest of the non-scientific reader. The work, however, cannot fail to be of the greatest service to the class of users for which it is avowedly prepared, and also a handy reference book for ornithologists. Indeed, the author is entitled to great credit for having placed before the public such a concise and excellent manual of the birds of so vast an area as the Palæarctic Region. — J. A. A.

Huntington's 'Our Feathered Game.'¹ — In a single volume of about 400 pages Mr. Huntington treats of all of the species of North American birds commonly hunted as game, among which are included the Bobolink and Mourning Dove, but not the Robin nor the Meadowlark. Of the former he says: "I have placed the Bobolink at the end of my list, a place most convenient to strike it off, and I hope before long the handsome song-bird of the meadows will not be an object of pursuit." In respect to the Mourning Dove he is less lenient, and although he mentions the States which have prohibited its shooting, he decidedly favors its continued treatment as a game bird.

This book is written by a sportsman, for sportsmen, and from the sportsman's point of view, and should prove welcome to such as care for a 'manual' of North American game birds in a single volume. The first chapter is introductory, treating of the changed conditions as regards the present scarcity of game birds, methods of hunting, stringent game laws, etc., in comparison with twenty-five years ago, when feathered game was abundant and the hunter could shoot whenever and wherever he pleased, with no limit to the bag. While the author manifests regret at the passing of these 'good old times,' he recognizes the necessity for stringent game protection. Chapters follow on 'Guns and Dogs,' and 'Game Clubs, Parks, and Preserves.' The rest of the book is divided into four sections and an appendix, treating respectively of (1) Gallinaceous Birds; (2) Wild-Fowl, or Swimmers; (3) Shore Birds or Waders; (4) Cranes, Rails, and Reed Birds, Wild Pigeons and Doves; (5) Appendix, giving brief descriptions of the species. The purpose and character of the book is well expressed in the author's closing paragraph of the introduction: "My observation of the birds is from the sportsman's blind, or as he sees them in a tramp across the field, with dog and gun; a sufficient description, however, being given in the notes at the end of the volume to enable the reader to identify the species. We do not go to the museums to compare skins with the naturalists in the hope of creating a subspecies, but to the fields to shoot over those still open, as well as on club-grounds and private preserves, making some inquiry by the way as to the natural history of our game, and the new methods of preservation and propagation." The eight full-page colored plates of shooting scenes are in the style of this author's well-known illustrations published in his 'In Brush, Sedge, and Stubble' (folio, 1899,) since republished as 'The True Game Birds,' while the 135 full-length 'bird portraits' are arranged in 29 half-tone plates at the end of the volume.—J. A. A.

¹Our Feathered Game | A Handbook of the | North American Game Birds | By | Dwight W. Huntington | With eight full-page shooting scenes in color | and one hundred and thirty-five bird portraits | Charles Scribner's Sons | New York, 1903—Crown 8vo, pp. xii + 396, 8 col. pl., 29 half-tone pll. Price, \$2.00 ; postage, 15 cts.

Degen on the "Perennial Moult" in the Australian Piping Crow.—As shown by the title,¹ Mr. Degen's memoir is not merely an account of the moult in one of the species of Australian Piping Crows, but an attempt to throw light upon "the archæornithic type from which the wing of the modern bird has been evolved. The main object of the paper is stated to be "to give additional evidence in support of the theory of the derivation of the feathering of the bird's wing." It was therefore found "necessary to ascertain the mode by which the perennial moult of the individuals of a species of bird is made up from the earliest to the last stages of renewal; and, further, to what extent each feather participates in this annual process during the period of complete feather-change." The species chosen for this investigation is the *Gymnorhina tibicen*, in which the moulting of the flight-feathers is traced from the beginning to the completion of the moult. The various stages, from the dropping of the first remex to the completed growth of the one last moulted, are described in detail and very clearly illustrated by numerous diagrams. Not only is the moult in this species traced in the most minute detail, but the history and previous literature of the general subject of ecdysis is considered, mostly *passim*, and the recent papers by Mr. Witmer² Stone and Dr. J. Dwight are frequently cited, as well as those of earlier writers. Beyond the minutely detailed record of the conditions of feather-change in the Piping Crow, there is little that is new to the general subject, but a confirmation of the conclusion reached by others as to the order of shedding and replacement of the flight-feathers. The two distinctly different principles of shedding and renewal are, first, "the regular sequence of their renewal on the hand-portion from within outwards, though accelerated in certain places or retarded in others, in order to maintain the requisite balance for flight, by a system of approximate symmetry for the whole wing during this critical change. This is the principle which forms the rule for probably the entire order of the Passeres," but not for some of the Picariae and many of the lower forms of birds. In the case of the cubital quills the moult begins with the first outer remex and proceeds inward to the fourth, but in the next series of three the order of moult is reversed, beginning with the seventh remex, then the sixth, and then the fifth.

"The renewal of the wing-coverts presents some notable deviations from that of the flight-feathers." While the latter assume their permanent order of renewal in the first moult, the wing-coverts pass through transitional stages before attaining their permanent order of renewal. A

¹ Ecdysis, as Morphological Evidence of the Original Tetractyle Feathering of the Bird's Fore-limb, based on the Perennial Moult in *Gymnorhina tibicen*. By Edward Degen, F. Z. S. Trans. Zoöl. Soc. London, Vol. XVI, Part viii, pp. 347-412, pl. xxxvi-xxxviii. May, 1903.

² Erroneously spelled "Wittmer" throughout the memoir.

"marked transverse or vertical element" is found to enter into the conditions, and "this transverse arrangement is a survival, therefore," according to the author, "of the phylogenetic affinities which link the present Class Aves to their Saurian ancestry." The great importance of the wing-coverts in "helping to clear up outstanding questions connected with the evolution of the organ of flight" has been fully reorganized by Pycraft and Goodchild whose conclusions are here cited.

Under the head of 'Conclusions' is a long discussion of the evolution of the wing of the modern bird, with regard to the original point of origin of the flight-feathers. His final conclusions are expressed in the following

REVISED SCHEME FOR THE DERIVATION OF THE FLIGHT-FEATHERS
FROM THE TETRADACTYLE ANCESTRAL FORM OF BIRDS.

Proto-metacarpo-digitalis = Hypo-metacarpo-digitalis =
Flight feathers of Phalangeal Origin. Flight feathers of Metacarpal Origin.

DIGIT I.

Suppressed (lost). Present *Penae* pollicis IV-I.

DIGIT II.

Present Metacarpo-digitalis XI-VI. Present intercalary row I-VI.

DIGIT III.

Present Metacarpo-digitalis V-I. Present Cubital Group II, Secondary Remiges (o) I-IV.

DIGIT IV.

Present Cubital Group III, Secondary Remiges V-VII. Present Cubital Group I, Secondary Remiges VIII-X.—Cubiti veri XI-x.

Direction of Movement



(Left Wing.)

"From the foregoing scheme it may be observed that there are no flight-feather equivalents allotted to the phalangeal portion of Digit I, in which part they figure as 'suppressed'. . . . This tendency towards a part-suppression, if carried further, would have the effect of leading to total apoptosis. It, moreover, must have proceeded contemporaneously with the feathering of the forearm and was still in progress after, as is evidenced in the Passeres, where it has reached the present climax in the Oscines proper.

"Considering the genealogical relative shortness of Digit I, coupled with the fact of a still greater reduction of size in the present forms of birds to one compound element, there is strong probability existing that, during the course of the fusion of the phalangeal segments of this digit with its originally independent metacarpal bone, they were stripped off

one after the other as in the case of the 'remicle' and other diminutive coverts"

As to the question of 'diastataxy,' the author believes that the present inquiry "supplies proof that 'faulting' is not confined alone to diastataxic wings, but takes place, though in inferior degree, in the short-armed eutaxic forms of birds, such as the Passeres."—J. A. A.

Weed's Bibliography of Economic Ornithology.—As the title states, this is only a "partial bibliography" of the subject to which it relates,¹ but as such it is disappointing as well in what it contains. Beginning with Wilson, 1808-14, we have listed a miscellaneous assortment of general works, as those of Bonaparte, Audubon, Nuttall, etc., and of special papers dealing often in only a slight or incidental way with the food habits of birds, while a number of 'reports' and papers treating especially of such matters are omitted. While a large part of the titles cited are more or less pertinent, we find no reference to several of the most important papers and reports that treat especially of the economic relations of Birds. In preparing the bibliography of such a subject, it is difficult to properly adjust the line of exclusion, but the omission of some of the most important titles seems to imply lack of care in compilation.—J. A. A.

Howe and Sturtevant's Revised List of the Birds of Rhode Island.²—This brochure of 24 pages "endeavors to bring up to date the present knowledge of Rhode Island avifauna, and to correct that work [the original list, published in 1899] both in misstatements and typographical errors." 'Part I,' of two pages, contains a note by Mr. James M. Southwick on the collection of Rhode Island birds presented to the Museum of Natural History at Roger Williams Park, Providence, by the late Charles H. Smith, which is stated to contain 292 species, represented by 480 specimens. Then follows 'Part II,' a 'Revised Annotated List of the Birds of Rhode Island,' numbering 283 species, besides 3 entered as "extirpated," and 8 as hypothetical. Several species of the original list are 'dropped,' and five are now added. Mr. Howe needlessly proposes (p. 22, footnote) the new generic name *Paulomagus* for the House Wren!—J. A. A.

¹ A Partial Bibliography of the Economic Relations of North American Birds. By Clarence M. Weed. New Hampshire College Agricultural Experiment Station, Technical Bulletin No. 5. Durham, N. H., 1902. 8vo, pp. 139-179.

² A Supplement to the Birds of Rhode Island. By Reginald Heber Howe, Junior, and Edward Sturtevant. 8vo, pp. 24. Middletown, Rhode Island, 1903.

Stone on Birds of Southern New Mexico and Western Texas.—Messrs. Stone and Rehn have recently published a paper on the Terrestrial Vertebrates of portions of southern New Mexico and western Texas, Mr. Stone being responsible for the portions relating to the birds and reptiles and Mr. Rehn for that on the mammals,¹ based on collections made by Mr. Rehn and Mr. H. L. Viereck in the spring and early summer of 1902, in El Paso County, Texas, and Otero County, New Mexico, with some material from other sources. The list of birds numbers 41 species, of which 31 rest on specimens *ta*² *et cetera*, and the other ten on field identifications of birds *sepi* *but not tace*³. The list is briefly annotated with the collector's field notes, and in some instances by remarks on the character or condition of the plumage. The range of *Spizella atrigularis* is extended considerably to the eastward of its former known distribution by the capture of a specimen in Dry Cañon, Otero Co., New Mexico.

The faunal relation of the localities visited in New Mexico "appears to be truly Lower Sonoran." This fauna seems to extend up the bottoms of the cañons, "while the slopes of the same and the foothills appear to possess more distinctly Upper Sonoran types." An arm of the Lower Sonoran appears to extend "off from the Rio Grande tract and runs up between the Organ and the Sacramento ranges, comprising the San Augustine plain."—J. A. A.

Oberholser on New Birds from Texas.—A vireo of the *bellii* type, intermediate between *Vireo bellii bellii* and *V. bellii pusillus* has been described⁴ by Mr. Oberholser as *Vireo bellii medius*, from southwestern Texas and immediately adjacent portions of Mexico. He has also described⁵ a new Cliff Swallow from the same region, under the name *Petrochelidon lunifrons tachina*.

He has also shown⁶ that the name *Hylophilus*, heretofore in current use for a large group of Central American and South American vireos, is preoccupied by *Hylophila* for a genus of insects, so that the proper generic name for the vireo group is *Pachysylvia* Bonaparte, 1850.—J. A. A.

Bonhote's List of Birds collected in the Bahamas.⁷—Mr. Bonhote made an ornithological collecting trip to the Bahamas in the winter of 1901-

¹ On the Terrestrial Vertebrates of Portions of Southern New Mexico and Western Texas. By Witmer Stone and James A. G. Rehn. Proc. Acad. Nat. Sci. Phila., 1903, pp. 16-34. May 7, 1903.

² Description of a New Vireo. By Harry C. Oberholser. Proc. Biol. Soc. Washington, Vol. XVI, pp. 17, 18, Feb. 21, 1903.

³ A new Cliff Swallow from Texas. *Ibid.*, pp. 15, 16, Feb. 21, 1903.

⁴ *Ibid.*, p. 101, June 23, 1903.

⁵ On a Collection of Birds from the Northern Islands of the Bahama-Group. By J. Lewis Bonhote, M. A., F. Z. S. The *Ibis*, July, 1903, pp. 273-312.

'02, which has furnished the basis for two papers, the first, entitled 'Field Notes on some Bahama Birds,' published recently in the 'Avicultural Magazine' (see Auk, *antea*, pp. 230, 231), and the second, here under notice, giving a formal list of the 104 species collected and notes on a few others observed but not taken.

A list of the specimens secured of each species is given, with the date and locality of capture, with, in some cases, quite extended notes on their habits and history as Bahama birds. There is some critical comment on a number of the species, particularly of the genus *Geothlypis*, but his remarks are not especially convincing to those who have reached opposite conclusions through better facilities for investigation. He claims to have added four species to the Bahama list, but one of them (*Nycticorax naevius*) was long since recorded by the late Dr. Northrop in an important paper on 'The Birds of Andros Island, Bahamas' (Auk, VIII, 1891, pp. 64-80), which Mr. Bonhote appears to have overlooked, as it is not cited in his references to previous authors. The paper contains much new and interesting information respecting the birds of the Bahamas and is thus a most welcome contribution to the subject.—J. A. A.

Sherborn's 'Index Animalium.'¹—Some ten or more years ago Mr. Sherborn entered upon the almost overwhelming task of compiling a list of the genera and species of animals, both living and extinct. An undertaking of such magnitude and importance quickly attracted the attention of prominent naturalists in England, and liberal support was received from the British Association, under whose auspices chiefly the work has been continued. The British Museum and other libraries, appreciating the exhaustive bibliographical researches involved, profited by Mr. Sherborn's knowledge of books in adding to their shelves many of the works not previously accessible in England. Through the intelligent coöperation of these libraries Mr. Sherborn has been enabled to consult practically all of the zoölogical literature from 1758 to 1800, his '*libri desiderati*' consisting mainly of unimportant works.

In view of the long time required to bring the list up to date, it was thought well to place a portion of it in the hands of zoölogists without delay, and to this end the part dealing with names published from 1758 to the close of the eighteenth century was issued late in 1902. This installment comprises a thick volume of over 1200 pages, containing nearly 60,000 entries, of which about one twelfth relate to birds.

¹ Index Animalium | sive | Index nominum quae ab A. D. MDCCCLVIII | Generibus et Speciesbus Animalium | imposita sunt | Societatibus eruditorum adiuvantibus | a | Carolo Davies Sherborn | confectus | sectio prima | a kalendis Ianuariis, MDCCCLVIII | usque ad finem Decembris, MDCCC | Cantabrigiae | E Typographio Academico | MDCCCCII—Roy. 8vo, pp. i-lx; 1-1795. Price 25 s, net.

The general plan of the work is excellent, the arrangement of names being alphabetical throughout, with the genera distinguished from species by means of capital initials. At the end of the main list the species are again grouped alphabetically under genera, where one may find at once all of the specific names used in combination with each genus. Thus, under *Psittacus*, we find 265 specific names; under *Falco*, 220, etc. In the general list specific names are given as originally spelled, without emendation or correction, followed by their respective generic terms, together with a correct citation, with date of publication, of the work in which they first appeared. Where a specific name is not new, but used for the first time in combination with another generic name, this fact is indicated by citing the original genus at the end of the reference.

Preceding the general list is a bibliography, wherein are briefly listed the titles of 1300 or more works handled by Mr. Sherborn in the preparation of the present volume, with important notes (too short, in most cases!) indicating the character of each work, whether binomial, or otherwise, etc.

Referring to the short list of 'libri desiderati,' we may dismiss two of those mentioned by saying that Wagner, 'Abbild. Nat. Kab. Bayreuth,' is not binomial,¹ and no systematic names occur in the 'Nieuwe Magazijn.'

In a work such as the present it is quite natural that there should be some omissions and occasional errors. These are, fortunately, as far as they pertain to birds, of no great moment, as the names omitted are more or less commonly cited in ornithological literature.² Some names are, through oversight, stated to be *nomina nuda* when they are not so. The genera of mammals named by Link (e. g., *Ondatra*, *Ochotona*, *Petaurus*), in his 'Beyträge' are thus indicated, but they are properly diagnosed on pp. 74-78, where typical species are also mentioned. The species names cited from Latham and Davies, 'Faunula Indica,' 1795, figure as *nomina nuda*, but most of them are based on the descriptions or plates of other writers, hence entitled to full standing.

On the other hand, a glance through Mr. Sherborn's list reveals many unfamiliar names, testifying to the care with which he has searched forgotten volumes. Especially to be mentioned are the specific names quoted from Vroeg, 'Catalogus Verzam. Vogelen,' 1764, and to the genera given in the 1758 edition of Moehring's 'Generum Avium' ('Geschlachten d. Vogelen'). The question of accepting Moehring's names at 1758 is one that may give rise to differences of opinion, but we are glad

¹ The mammal names *Armodillo* and *Tatu* occur in it.

² Among the omissions may be mentioned *Rallus ecaudatus* King, 1784; *Motacilla cyanea* Ellis, 1782; *Larus crepidatus* Banks, 1773; also the species of Hermann's *Tabula Affin. Anim.*, 1783, and those described by Gunnerus, in Leem's *Beskr. over Finmarkens Lapper*, 1767.

to see them in the 'Index'; it is better to include doubtful names than to omit them, as their disposition is a matter for the decision of the specialist.

In conclusion, we have only the highest praise to offer for Mr. Sherborn's work. It is to be hoped that workers in the various branches of zoölogy will coöperate with the compiler, with the object of gathering up the odds and ends overlooked in the present part, that they may be included in a later one, and we trust the undertaking will not lack the assistance and support necessary to bring it to a successful and early termination.—C. W. R.

The 'Index Zoologicus.'¹—This important supplement to the well-known 'Nomenclator Zoologicus' of Scudder is based largely upon the names recorded since 1879 in the yearly volumes of the 'Zoological Record,' but valuable references have been gathered from other sources, such as published lists of genera of special groups; from works overlooked by Agassiz, Marschall, and Scudder, as well as from manuscript lists submitted by various systematists. About 40,000 names are given in the 'Index,' nearly one fourth of which were instituted prior to 1880; the remainder represent the work of zoölogists during twenty years, an average of 1,500 names per annum.

The new 'Index' will afford temporary relief to the zoölogist, but a new and thoroughly revised 'Nomenclator' is much needed. In the 'Index' we have a worthy complementary volume to the list prepared by Scudder, thus making accessible to workers a more complete catalogue of generic and subgeneric names than has hitherto been possible, but it is evident that the next edition will produce an additional large crop of forgotten terms,² and that perfection cannot be expected until zoölogical literature

¹ Index Zoologicus | an alphabetical list of names of genera and | subgenera proposed for use in Zoology | as recorded in the | "Zoological Record" 1880-1900 | together with | other names not included in the "Nomenclator | Zoologicus" of S. H. Scudder | compiled (for the Zoological Society of London) | by | Charles Owen Waterhouse | and edited by | David Sharp, M. A., F. R. S. | Editor of the "Zoological Record" | London | Printed for the Society | Sold at their house in Hanover Square | and by | Gurney & Jackson, Paternoster Row | MDCCCCII | — 8vo, pp. i-xii; 1-421. Price, 20 s.

² The following are suggested, in the Class Aves: *Asturætos* Brehm, 1855; *Autruchon* Temm., 1840; *Budyanthus* David, 1867; *Calandrina* Blyth, 1855; *Chlorion* Temm., 1838; *Cinnamopteryx* Reichenow, 1886; *Corax* Kaup, 1854; *Cyphornis* Cope, 1894; *Falcator* Temm., 1821; *Gingala* Rafin., 1815; *Huhus* Rafin., 1815; *Kenopia* "Blyth, 1855"; *Melanopteryx* Reichenow, 1886; *Miserythrus* Newton, 1875; *Oxyporus* et al. Brookes, 1828; *Palæonornis* Emmons, 1857; *Phaeopharus* Madarász, 1900; *Pomarinus* Fischer, 1803; *Tapera* Thunberg, 1819; also names proposed by Bertoni (see Auk, 1902, pp. 414-416).

has been carefully sifted on the lines so well begun by Mr Sherborn in his 'Index Animalium.'

Some errors are apparent in the 'Index' that might have been avoided had it been practicable to circulate proof-sheets among specialists for correction. Among the bird names we note *Agropsa*, for *Agropsar*; *Arguata*, for *Arquata*; *Eubates*, for *Eribates*; *Megaquiscalis*, for *Megauiscalis*; *Perenopterus*, for *Percnopterus*; and *Conuropsis* is credited to Hasbrouck, instead of Salvadori.—C. W. R.

Ornithological Magazines. 'The Osprey.'—With the number for January, 1902, 'The Osprey'¹ entered upon Volume I of its 'New Series' (Vol. VI of the whole series). Up to January, 1903, however, only six numbers had appeared; another has since been printed but apparently has not been issued. The January number contains: 'The California Jay (*Aphelocoma californica*) ; some of its habits and characteristics,' by D. A. Cohen; 'Random and Reminiscent Maine Bird Notes,' by W. C. Kendall (on the decrease of birds in Maine during the last twenty years, and advocating more stringent bird protection); 'August Birds of Stony Man Mountain, Virginia,' by William Palmer; 'Life and Ornithological Labors of Sir John Richardson,' compiled by Theodore Gill (with portrait of Richardson). Reviews of Lucas's 'Animals of the Past (illustrated)' and of Macoun's 'Catalogue of Canadian Birds' complete the regular text, to which is added, as a separately-paged supplement, 'General History of Birds,' Chapter I (pp. 1-4), treating of 'The English Names,' and 'The Birds' Place in Nature.'

The February number has: 'Notes on the Habits of the Broad-winged Hawk (*Buteo platypterus*) in the Vicinity of Washington, D. C.,' by J. H. Riley (nest illustrated); 'Rambles about my Old Home,' by Milton S. Ray (at San Mateo, Cal., contrasting present conditions with those of eighteen years ago); 'The Mocking Bird at Home,' by F. H. Knowlton; 'Reminiscent and Random Maine Bird Notes,' by W. C. Kendall (continued from Jan. number); 'Professor Alfred Newton, F. R. S.,' by Dr. R. W. Shufeldt (with portrait). Reviews of Ridgway's 'Birds of North and Middle America,' Part I, and Herrick's 'The Home Life of Wild Birds' (with sample illustrations), complete the regular text, with pp. 5-12 of 'The General History of Birds,' containing 'Characters of the

¹ The Osprey. An Illustrated Magazine of Ornithology. Published monthly. Edited by Theodore Gill and Paul Bartsch, in collaboration with Robert Ridgway, Leonhard Stejneger, Frederic A. Lucas, Charles W. Richmond, William Palmer, and Harry C. Oberholser of Washington, and Witmer Stone of Philadelphia. New Series, Vol. I, 1902, 4to, pp. 1— + 1— of 'General History of Birds.' The Osprey Company, Washington, D. C. Subscriptions in United States, Canada and Mexico, \$1.00 a year; single copies, 10 cents; foreign subscriptions, \$1.25 a year, postage paid.

Class,' the 'General Characters of Birds,' and the beginning of the 'Plumage of Birds,' the latter by Dr. Hubert Lyman Clark.

The March number contains: 'Notes on some Yellow-throated Vireo's Nests,' by William R. Maxon; 'The Birds of the Marianne Islands and their Vernacular Names.—I,' by W. E. Safford; 'Notes on McCown's Longspur in Montana,' by P. M. Sillaway; 'The Carib Grassquit (*Euetheia bicolor omissa*),' by B. S. Bowdish; 'Board and Lodging for Birds'; 'An Albino Vesper Sparrow,' by R. W. Williams, Jr.; 'The Thick-billed Red-wing, a new bird record for Iowa,' by [P.] Bartsch; 'Biographical Notice of John Cassin,' by Theodore Gill. Brief obituaries of Hugh Alexander Macpherson and Alpheus Hyatt complete the number, to which are added pp. 13, 14 of the 'General History of Birds.'

The April number has: 'The Feeding Habits of the Coot and other Water Birds,' by Barton Warren Evermann, and 'The Birds of the Marianne Islands and their Vernacular Names,' by W. E. Safford (continued from March number). Pages 15-20 of the 'General History of Birds' are added, treating of 'Moulting or Molting,' by William Palmer. A half-tone frontispiece gives portraits of John Cassin, Thomas Wilson (two views), and George A. McCall. There is a short note on each of the two latter on p. 96 of the June number, and a biographical notice of the first in the March number (pp. 50-53).

The May number contains: 'Winter Water Fowl of the Des Moines Rapids,' by Ed. S. Currier; 'The Destruction of Birds by Lighthouses,' by Bernard J. Bretherton; and 'The Porto Rican Pewee (*Blacicus blancus*),' by B. S. Bowdish. There is a further installment (pp. 21-26) of the 'General History of Birds,' being the beginning of 'Chapter II, General Anatomy,' by Dr. R. W. Shufeldt.

The June number contains: 'The Mississippi Kite (*Ictinia mississippiensis*),' by Albert Franklin Ganier; 'Recent Views of the Sable Island or Ipswich Sparrow,' by W. E. Saunders; and 'Northern Parula Warbler,' by J. Merton Swain. Also pp. 27-34 of the 'General History of Birds,' continuing the chapter on 'General Anatomy.'

The July number (so far as we know not yet—Sept. 15, 1903—distributed to subscribers, although printed some months ago) contains 'Notes on Birds of the Pribilof Islands,' by Dr. D. W. Prentiss, Jr.; 'A Study of the Genus *Perisoreus*,' by Reginald Heber Howe, Jr.; 'The Cerulean Warbler, a Summer Resident near Washington,' by William R. Maxon; 'Notice of Dr. James G. Cooper,' by William H. Dall, copied from 'Science (only part here published and marked 'to be continued'))'; and pp. 35-42 of the 'General History of Birds.' A frontispiece half-tone illustrates the 'Mississippi Kite and Nest,' and there is a portrait of the late Dr. J. G. Cooper.

'The Osprey,' never a model in promptness of publication, has of late fallen far below its usual standard, the last number bearing date July, 1902. We certainly hope this does not indicate its permanent demise, for it has always been a useful Journal and is already greatly missed.—J. A. A.

Chapman's 'The Economic Value of Birds to the State.'—By request of the New York State Forest, Fish, and Game Commission, Mr. Chapman has prepared a paper on 'The Economic Value of Birds to the State,'¹ of which advance copies have just been received. It forms a part of the Annual Report of the Commission for the year 1902, and consists of nearly seventy pages of text and twelve colored plates by Fuertes, drawn especially for the work, and effectively reproduced by Hoen & Company of Baltimore. They form one of the most beautiful series of bird plates yet published. The drawings are at Fuertes's best, and the reproduction merits high praise. The twelve plates illustrate twenty-four species of our common land birds, the leading types, from Hawks to Thrushes.

The text is well worthy of the beautiful plates. Although, as the case necessarily requires, the paper is largely a compilation, the selections are judiciously made, as regards sources of information and choice of matter, which is largely from special bulletins and reports on the food habits of birds published by the Biological Survey, under the auspices of the U. S. Department of Agriculture. The first twenty pages are devoted to a general discussion of the economic value of birds to the forester, the fruit-grower, the farmer, and the citizen, being a statement of 'What the bird does for the State,' followed by 'What the State does for the Bird,' and 'What the State should do for the Bird.' This is succeeded by 'Statistics of Food Habits' (pp. 23-63), in which the leading groups, and certain of the species, of land birds are treated in systematic sequence; and to this is added a bibliography of about seventy-five titles, listing the more important papers relating to the food of American birds.

The attitude of the author on the question of 'The Bird and the State' may be indicated by the following extract from his opening paragraph: "The bird is the property of the State. From this fundamental conception of the bird's legal status there can be no logical ground for dissent. If a certain species of bird is conclusively proven to be injurious to the agricultural or other interests of the State, no one would deny the State's right to destroy that species. If, on the contrary, a species is shown to be beneficial, then the State has a right to protect it. Indeed, we may go further and say it is not only the right, but the duty of the State to give its birds the treatment they deserve."

Mr. Chapman's paper is an excellent compendium of our present knowledge of the economic relations of our birds, and the New York State Forest, Fish, and Game Commission has shown an intelligent conception of its duties and functions in placing before the public so important a memoir in such an attractive form. — J. A. A.

¹ State of New York | Forest, Fish and Game Commission | — | The Economic Value of Birds | to the State | By | Frank M. Chapman | Associate Curator of Mammalogy and Ornithology in the American | Museum of Natural History | [Seal] Albany | J. B. Lyon Company, Printers | 1903 — 4to, pp. 1-66, 12 colored plates. September, 1903.

Publications Received. — **Alexander**, Boyd. On the Birds of Fernando Po. (*Ibis*, July, 1903, pp. 330-403; also separate, pp. 75.)

Anderson, Malcolm P., and Joseph Grinnell. Birds of the Siskiyou Mountains: A Problem in Distribution. (*Proc. Acad. Nat. Sci. Philadelphia*, 1903, pp. 4-15.)

Bau, Alexander. Antwort au Herrn Dr. Kurt Floricke. 8vo, pp. 4.

Bonhote, J. Lewis. On a Collection of Birds from the Northern Islands of the Bahama Group. (*Ibis*, July, 1903, pp. 273-315.)

Dresser, H. E. A Manual of Palæarctic Birds. 8vo, London. Published by the Author, 3 Hanover Square, W. Price, 25 s.

Dubois, Alphonse. Synopsis Avium, Fasc. XIII and XIV, 1903.

Dutcher, William. The Flicker. (*National Committee of Audubon Societies, Leaflet No. 5.*)

Grinnell, Joseph. Call Notes of the Bushtit. (*Condor*, V, No. 4, July, 1903.)

Hartert, Ernst, und Carl Hellmayr. Ueber die Pipriden-Gattung *Masius* Bp. (*Orn. Monatsb.*, No. 3, März, 1903.)

Hellmayr, C. E. (1) Ueber neue und wenig bekannte südamerikanische Vögel. (*Verhandl. der k. k. zool.-bot. Gesells. in Wien*, 1903, pp. 199-223.) (2) Einige weitere Bemerkungen über *Polioptila*. (*Ibid.*, pp. 223-226.)

Huntington, Dwight W. Our Feathered Game. 8vo, Charles Scribner's Sons, New York. Price, \$2.00 net.

Lorenz, Dr. L. von, und C. E. Hellmayr. Ein Beitrag zur Ornith. Süd-Arabiens. (*Denks. Math.-Naturwis. Classe d. Kais. Akad. d. Wissenschaften zu Wien*, LXXI, 1902, pp. 1-18.)

Macoun, John. Catalogue of Canadian Birds. Part II. Ottawa, Geol. Surv. of Canada. Price, 10 cents.

Oberholser, Harry C. (1) A New Cliff Swallow from Texas. (*Proc. Biol. Soc. Wash.*, XVI, pp. 15, 16.) (2) Description of a New Vireo. (*Ibid.*, pp. 17, 18.) (3) Note on the Generic Name *Hylophilus*. (*Ibid.*, p. 101.)

Rathbun, Richard. Report upon the Condition and Progress of the U. S. National Museum during the year ending June 30, 1901. (*Report U. S. Nat. Mus. for 1901*, pp. 1-174.)

Schiebel, Guido. (1) Die Phylogene der *Lanius*-Arten. (*Ornith. Monatsb.*, 1903, pp. 105-112.) (2) In welchem Monat bekommt der schwarzstirnige Würger (*Lanius minor* Gm.) sein Alterskleid? (*Orn. Jahrb.*, 1903, pp. 140-143.)

Shufeldt, R. W. (1) Bird Photographs for Bird-books. (*Profess. and Amateur Photog.*, July, 1903, pp. 245-250.) (2) Photographing Quails and Partridges. (*Amer. Inventor*, July 15, 1903, pp. 35-36.)

Torrey, Bradford. The Clerk of the Woods. 16mo, Houghton, Mifflin and Company, 1903. Price, \$1.10, net.

Tschusi zu Schmidhoffen, Vict. Ritter von. (1) Ueber Palæarktische Formen. (*Ornithol. Jahrb.*, XIV, 1903, pp. 138-140.) (2) Zoologische

Litteratur der Steiermark. Ornithologische Literatur. (Mitteil. Naturwiss. Ver. f. Steiermark, 1902, pp. lviii-lxii.)

Wilson, James. Regulations for the Protection of Game in Alaska. (Biolog. Surv. Circular No. 39.)

Aquila, IX, 1902, Supplementum. 1903.

American Ornithology, III, Nos. 7-9, July-Sept., 1903.

Anales del Museo Nacional de Montevideo, IV, pt. 1 and 2, 1903.

Annals of Scottish Natural History, No. 47, July, 1903.

Atlantic Slope Naturalist, No. 3, July-August, 1903.

Avicultural Magazine, New Ser., I, Nos. 9-11, July-Sept., 1903.

Bird-Lore, V, No. 4, July-Aug., 1903.

Birds and Nature, No. 2, Sept., 1903.

Bulletin British Orn. Club, No. XCIX, 1903.

Bulletin Michigan Orn. Club, IV, No. 2, June, 1903.

Canadian Record of Science, IX, No. 1, 1903.

Condor, The, V, No. 4, July-Aug., 1903.

Emu, III, Pt. 1, July, 1903.

Forest and Stream, LXI, Nos. 1-13, 1903.

Knowledge, XXVI, Nos. 213-215, July-Sept., 1903.

Monthly Bulletin, Pennsylvania Dept. Agric., Nos. 3-5, July-Sept., 1903.

Naturalist, The, Monthly Journ. of Nat. Hist. for North of England, Nos. 558-560, July-Sept., 1903.

Ornithologische Monatsberichte, XI, Nos. 7-9, July-Sept., 1903.

Ornithologische Monatsschrift, XXVII, No. 6, June, 1903.

Ornithologisches Jahrbuch, XIV, Mai-Aug., 1903.

Ottawa Naturalist, XVII, Nos. 4-6, July-Sept., 1903.

Our Animal Friends, XXX, Nos. 11, 12, XXXI, No. 1, July-Sept., 1903.

Proceedings Acad. Nat. Sci. Philadelphia, 1903, Pt. 1.

Records of the Australian Museum, V, No. 1, April, 1903.

Science, N. S., XVIII, Nos. 444-456, 1903.

Wilson Bulletin, X, No. 3.

Zoölogical Quarterly Bulletin, Pennsylvania Dept. Agric. I, No. 2, Aug., 1903.

Zoölogist, The, (4) VII, Nos. 745-747, July-Sept., 1903.

CORRESPONDENCE.

The Use of Trinomials.

EDITORS OF 'THE AUK':—

Dear Sirs :—While further discussion of trinomials is perhaps unnecessary I am tempted to comment upon some misleading statements in Mr. Loomis's article in the July issue of 'The Auk,' especially since his paper so thoroughly voices the popular outcry against the recognition of geographic races, and would seem to dispose of the difficulties in the case so easily.

(1) Mr. Loomis's parallel between the recognition in nomenclature of sexes and seasonal plumages on the one hand and geographic races on the other seems ill founded. It is true of course that we do not recognize plumages as distinct species when we have learned their real nature, but any one who has read Dr. Dwight's paper (Auk, 1902, p. 248) will surely admit that we have by no means abandoned a distinct nomenclature for plumages; indeed, the most flagrant trinomial must pale into insignificance beside the "compound juveno-non-nuptial plumage"!

(2) Mr. Loomis constantly speaks of "geographic variants" and "full fledged species" as if the two were readily distinguishable. If he can formulate any way by which we can separate species and subspecies except by individual opinion, he has indeed solved the problem. It seems to me that the one fact that is being inevitably forced upon us by modern systematic study is that the "geographic variants" are the fundamental elements which in any nomenclature must receive primary recognition. Many of our old-time "species" have been found utterly inadequate in their application and the independent recognition of their components and of allied forms unknown when the "species" were established is inevitable. To extend the limits of a "species" to include without further comment such diverse forms as the extremes of the Song Sparrow series would render systematic nomenclature absurd and well nigh useless.

Dr. Allen has to my mind put the matter very clearly when he claimed that we can be no more expected to keep our investigations in systematic zoölogy within the limits easily comprehended by the laity than the histologist can be expected to confine his labors to the same bounds.

Dr. Dwight's statement, after his exhaustive studies of plumages, that "the facts about plumages and moults do not lend themselves to simple explanation" and "will no doubt seem obscure and complicated" applies exactly and with added force to modern systematic researches.

That our present rules of nomenclature may have to be altered in some respects I will admit, but as I have already stated (Condor, 1903, p. 43) I regard the preservation of trinomials as of the greatest importance.

Very truly yours,

WITMER STONE.

Acad. Nat. Sci., Phila., Sept. 17, 1903.

NOTES AND NEWS.

THE TWENTY-FIRST ANNUAL CONGRESS of the American Ornithologists' Union will be held at the Academy of Natural Sciences, Philadelphia, beginning on the evening of Monday, November 16, 1903. The evening session will be for the election of officers and members and for the transaction of routine business. Tuesday and the following days the sessions will be for the presentation and discussion of scientific papers, and will be open to the public. Members intending to present communications are requested to forward the titles of their papers to the Secretary, Mr. John H. Sage, Portland, Conn., so as to reach him not later than November 13.

PROFESSOR WILBER CLINTON KNIGHT, an Associate of the American Ornithologists' Union, died at his home at Laramie, Wyoming, July 28, 1903, of peritonitis, after an illness of six days. Prof. Knight was born at Rochelle, Ills., Dec. 13, 1858. His boyhood days were passed upon the farm where daily communion with Nature exercised a marked influence upon his tastes, which were early indicated by his choice of books and the lines of study he pursued. With his people he moved to Nebraska where he obtained his education, graduating a Bachelor of Science from the State University in 1886. Immediately following his graduation he was appointed Assistant Territorial Geologist for Wyoming, and thereafter progress in his profession may be summed up as follows: The year 1887-88, Assayer at Cheyenne; Superintendent of mines in Colorado and Wyoming, 1888 to 1893; Professor of Mining, University of Wyoming, 1893 and 1894; Professor of Geology, Mining Engineering, Principal of the School of Mines, Geologist of the Wyoming Agricultural Experiment Station, and Curator of University Museum from 1894 to date of his death; State Geologist 1898-99.

Well earned post graduate degrees of M. A. and Ph. D. were conferred upon Prof. Knight by the University of Nebraska in 1893 and 1901, respectively.

Numerous publications from his pen, usually in the form of bulletins or magazine articles, have appeared from time to time, the most important of the former being as follows: Bulletin No. 1, 'The Petroleum of the Salt Creek Oil Field, its Technology and Geology,' 1896. Bulletin No. 2, 'The Petroleum Oil Fields of the Shoshone Anticlinal, Geology of the Popo Agie, Lander and Shoshone Oil Fields,' 1897. Bulletin No. 3, 'The Geology of the Oil Fields of Crook and Uinta Counties, Wyo.,' 1899. Bulletin No. 4, 'Geology of the Oil Fields of Natrona County, Excepting Salt Creek.' Bulletin No. 5, 'The Newcastle Oil Fields, Wyo.' Bulletin No. 6, 'The Bonanza, Cottonwood and Douglas Oil Fields,' 1903. Bulletin No. 14, 'Geology of the Wyoming Experiment Farms,' 1893. Special Bulletin, 'The Sweetwater Mining District.'

Bulletin 49, 'Alkali Lakes and Deposits'; and Bulletin No. 55, 'The Birds of Wyoming.'

A list of other publications which appeared in 'Science,' 'The Engineering and Mining Journal,' 'The American Manufacturer and Iron World,' 'Mineral Industry,' 'American Journal of Science,' 'National Geographic Magazine,' 'Journal of Geology,' 'Bulletin of the Geological Society of America,' Reports of the U. S. Geological Survey, and other periodicals of high standing, would include about forty titles, all of which were exploitations of the results of original research and painstaking investigation.

Of his bulletins, No. 55, 'The Birds of Wyoming,' is the only one devoted to the subject in which the readers of 'The Auk' have especial interest. While ornithology was a subject of secondary interest to Prof. Knight, the character of his bird work is in every way commendable. In his introductory to this bulletin the author says: "Being a geologist it may appear strange for me to pose as the author of a bird bulletin." One thing, however, was made plain; there was a great public demand for such a bulletin. It may be said, also, that such demand was supplied by this publication. It is interesting to note in this connection, that the demand for this publication shows that its popularity is greater than that of any other bulletin issued by authority of the Wyoming University. That extreme care and anxiety to be strictly accurate which marks all of the published works of Prof. Knight, is conspicuous here, the author's aim being to secure a correct list of Wyoming birds rather than a large one. A hypothetical list at the close of the bulletin supplied a place for species many less careful authors would have placed among the unquestioned birds of the State.

As a citizen and a man Prof. Knight stood in the first rank. He believed the interests of the community and of the State should command a reasonable share of the time and energy of the individual and he gave freely of both for the promotion of the general welfare. He died poor in worldly goods but rich in worthy accomplishments. His integrity, unassailable and unquestioned, often stood in the way of pecuniary advancement, but his record, now made up, is one his sons may emulate without fear of making a mistake. In his untimely death the American Ornithologists' Union loses an able and painstaking student and Associate.—F. B.

Dr. GUSTAV F. R. VON RADDE, a Corresponding Fellow of the American Ornithologists' Union, died early in the present year at Tiflis, Russia, in his 72d year. He was born at Danzig, November 27, 1831. From a short sketch of Dr. Radde's life published in 'The Ibis' (July, 1903, pp. 439, 440) we learn that he was the son of a schoolmaster, and early showed his predilection for Natural History. In 1852 and the following years he was employed in the Crimea as an assistant to the botanist Steven, and in 1854 published a memoir on the botany of the Tauric

Peninsula. In 1855 he was called to St. Petersburg by the Russian Geographical Society to join Schwartz's expedition to Amoorland, where he spent four years in exploration, the results of which were published in his well-known 'Reisen im Süden von Ost Sibirien,' in several quarto volumes with numerous plates, by the Russian Geographical Society in 1862-63. The second volume, entitled 'Die Festlands-Ornis des Südöstlichen Siberiens,' is his most important ornithological publication, and through which he is well known to ornithologists. In 1864 "he took up his residence at Tiflis, where he founded a Natural History Museum and Library and remained actively engaged in their administration and on various kindred pursuits up to the time of his death. Next to the Siberian volume, Radde's 'Ornis Caucasica,' published at Cassel in 1884, is the one amongst his numerous scientific works and memoirs, illustrative of the Natural History of the Caucasus and of adjoining portions of the Russian dominions, by which he is best known to ornithologists." He was throughout his life an ardent traveller, and in recent years made voyages to Japan, India, and North Africa, with members of the Imperial family, with whom he seems to have been a favorite. "At the time of his death he was engaged in the preparation of an account of the collections of the Caucasian Museum, of which three volumes (out of six) have already appeared."

THE ANNUAL meeting of the British Ornithologists' Union was held at the meeting-room of the Zoölogical Society of London on the evening of May 13. Dr. F. DuCane Godman was reëlected President and Mr. Howard Saunders Secretary. Twenty new Ordinary Members were elected, and Capt. F. W. Hutton, F. R. S., Col. W. Vincent Legge, F. Z. S., and Alfred J. North, were elected Colonial Members, and Dr. Giacinto Martorelli, of Milan, a Foreign Member. Mr. Robert Ridgway was transferred from the list of Foreign Members to that of Honorary Members—the only American on whom has been conferred this honor since the decease of Professor Baird. In this connection it may be mentioned that Mr. Frank M. Chapman was elected a Foreign Member at the annual meeting in 1902.

MAJOR EDGAR A. MEARNS, Medical Department U. S. Army, was ordered to the Philippines some months since, and sailed from San Francisco for his new post of duty about the end of last June.

DR. CHARLES C. ADAMS, curator of the University of Michigan Museum at Ann Arbor, has announced, in a recent number of 'Science' (Aug. 14, p. 217; see also Bull. Michigan Orn. Club, IV, p. 63) the discovery of the breeding area of Kirtland's Warbler (*Dendroica kirtlandi*). The capture of a specimen in June last in Oscoda County, Michigan, by Mr. E. H. Frothingham (see Bull. Michigan Orn. Club, IV, p. 47) led to

the sending of Mr. N. A. Wood, the taxidermist of the Museum, to make a thorough search for the nest and eggs of this rare species. The quest was successful, Mr. Wood securing "two nests with young and one egg, thus establishing beyond question the breeding area of this species," which had been heretofore wholly a matter of conjecture.

ACCORDING to a recently published report (P. Z. S., 1902, pp. 166-171) by the Secretary of the London Zoölogical Society, there were living in the Society's Gardens, in January, 1902, 147 specimens of Parrots, referable to 107 species, including several of great rarity. The oldest bird in the Parrot-house was a Cockatoo (*Cacatua gymnopis*), which had been in the Society's possession for 33 years. The report is accompanied by a colored plate of *Eclectus westermanni*, showing the green male and the red, blue-breasted female, and also a plate of the rare *Platycercus mastersianus*.

'OUR ANIMAL FRIENDS,' with the first number of Volume XXXI, appears in a new form and certainly has a very 'up to date' appearance. Its opening editorial presents "a retrospective glance at the progress of the work of animal protection during the past thirty years," briefly contrasting *now* with *then*. The change, as is stated, is due to *education*, in which the management of this magazine has taken so prominent a part. "The public conscience no longer tolerates cruelty, and to prove the fact of cruelty, however influentially supported, brings public opinion, in its ultimate form of legal enactment, when that is necessary, to the vindication of the rights of the weak against the inhumanity of the strong and the thoughtless." 'Our Animal Friends' has our highest respect and our best wishes, and we trust that its future career will be as influential and as successful in this great cause as it has been in the past.

MR. S. N. RHOADS is preparing a paper, to be presented at the next meeting of the A. O. U., to be held in Philadelphia in November, on the zoölogy of Delaware, with special reference to birds, and would be very glad to receive information—lists and specimens—bearing on the subject. Any assistance thus rendered will be duly accredited. Mr. Rhoads's present address is 121 S. 3rd St., Philadelphia, Pa.

INDEX TO VOLUME XX.

[New generic, specific and subspecific names are printed in heavy-faced type.]

Acanthis *linaria*, 236.
 hornemannii exilipes, 282.
Accipiter *atricapillus*, 53, 212.
 atricapillus striatulus, 183.
 cooperi, 183, 205.
 velox rufulatus, 183, 364.
Acredula, 198.
Acrocephalus *familiaris*, 384, 390.
Actitis *macularia*, 33, 281.
Actodromas, 335.
 acuminata, 336.
 bairdii, 336.
 damacensis, 336.
 fuscicollis, 336.
 maculata, 336.
 minutilla, 336.
Ægilialis *meloda*, 22, 305, 364.
 meloda circumcincta, 364.
 semipalmata, 22.
 vocifera, 204, 263, 281.
 wilsonia, 22.
Æpyornis, 323.
Æsalon, 339.
Æstrelata *hypoleuca*, 386.
Agelaius *chrysopterus*, 12.
 gubernator californicus, 186.
 phœniceus, 206.
 phœniceus neutralis, 186.
 phœniceus richmondi, 76, 365.
 tricolor, 186.
Agropsa, 451.
Agropsar, 451.
Ajaia *ajaja*, 22.
Albatross, *Laysan*, 385.
Alca *torda*, 51.
 pygmæa, 359.
Alle *alle*, 51, 209.
Allen, Francis H., the Blue-gray Gnatcatcher in Massachusetts, 69; vernacular names of birds, 236.
Allen, J. A., the A. O. U. Check-list—its history and its future, 1-9; vernacular names of birds, 70-73; note on *Psittacula modesta* Cabanis, 213; note on *Sylvia cærulea* Wilson, 216-218; 'some suggestions,' 234; the California Meeting of the American Ornithologist's Union, 299-302.
Aluco, 360.
Aluconidae, 360.
Amazilia *aliciæ*, 290.
American Museum of Natural History, notice of its 'Bird Rock Group,' and 'Shore Bird Group,' 246.
American Ornithologists' Union, Twentieth Congress of, 59-63; notice of a proposed meeting to be held in California, 245; report of the California meeting, 299-302; Twelfth Supplement to the Check-List of North American Birds, 331-368; Twenty-first Congress, 457.
Ammodramus, 350.
 australis, 362.
 bimaculatus, 349.
 halophilus, 79, 348.
 henslowi, 232.
 maritimus, 361.
 maritimus macgillivraii, 361.
 rostratus guttatus, 79, 365.
 rostratus halophilus, 365.
 samuelis, 296, 351.
 sandwichensis, 283.
 savannarum, 13, 178.
 savannarum passerinus, 264, 362.
Ampelis *cedrorum*, 283.
 garrulus, 283.
Amphispiza *belli nevadensis*, 207, 366.
 nevadensis, 366.
Anas *acuta*, 251.
 boschas, 204, 209, 278, 303.
 laysanensis, 384, 396.
 obscura rubripes, 226.
Ancyllocheilus, 337.
Anhinga, 323.
Anous *stolidus*, 385.

Anser albifrons gambeli, 52.
Anthony, A. W., migration of
Richardson's Grouse, 24-27.
Antrostomus vociferus, 23, 264.
Ant-shrike, Barred, 291.
Aphelocoma sieberii couchii, 345.
Aquila chrysaëtos, 67, 183, 439.
Aramus giganteus, 22, 169, 175.
Archæopteryx, 323.
Archibuteo lagopus sanctijohannis,
269.
Ardea cærulea, 334.
canadensis, 251.
candidissima, 333.
egretta, 333.
garzetta, 333.
herodias, 332.
herodias wardi, 332.
javanica, 334.
ludoviciana, 334.
occidentalis, 22.
rufa, 333.
rufescens, 333.
violacea, 335.
virescens, 174, 334.
virescens anthonyi, 334.
virescens frazari, 334.
wardi, 332.
Ardetta exilis, 22, 263.
Arenaria interpres, 210.
melanocephala, 33.
morinella, 22.
Arguata, 451.
Arquata, 451.
Arquatella, 335.
couesi, 335.
maritima, 335.
ptilocnemis, 335.
Asio, 273.
accipitrinus, 212.
otus, 274.
virginianus, 275.
virginianus pacificus, 275.
virginianus pallescens, 275.
virginianus saturatus, 275.
virginianus subarcticus, 275.
Astragalinus psaltria, 188.
psaltria arizonæ, 79, 347.
tristis, 206.
Asturætos, 450.
Asyndesmus, 341.
torquatus, 341.
Atlantic Slope Naturalist, notice
of, 328.
Audubon, John James, letters from
to Edward Harris, 378-383.
Audubon Societies, third annual
conference of, 99; notice of 'Educational Leaflets' issued by the
National Committee of, 248.
Auk, Great, 83.
Razor-billed, 51.
Auklet, Cassin's, 30.
Autruchon, 450.
Aythya affinis, 22, 64, 278.
collaris, 22, 279.
marila, 64, 278.
marila nearctica, 165.
vallisneria, 278.
BÆOLOPHUS, 308, 357.
atricristatus, 308, 358.
bicolor, 308, 358.
bicolor texensis, 308, 358.
inornatus, 308, 358.
inornatus cineraceus, 308,
358. *
inornatus griseus, 308, 358.
wollweberi, 308, 358.
Bailey, Florence Merriam, review
of her 'Handbook of Birds of the
Western United States,' 76-78.
Baily, William L., see Dutcher,
William.
Baldpate, 378.
Bangs, Outram, notice of his papers
on new American birds, 320; notice of his Revised List of
the Birds of the Liu Kiu Islands,
320.
Barlow, Chester, obituary notice
of, 92.
Barrett-Hamilton, G. E. H., notice
of his paper 'On the Position
occupied by the Legs of Birds
during Flight,' 321.
Bartramia longicauda, 65, 281.
Basileuterus, 75.
culicivorus flavescens, 75.
Bellona exilis, 23.
Bent, A. C., Black Vulture at Taun-
ton, Mass., 6.
Berniera, 391.
Bignell, Effie, notice of her 'My
Woodland Intimates,' 316.
Bird, Frigate, 285, 386.
Miller, 384; 390, 392.
Rice, 170.
Red-tailed Tropic, 385.
Bird-Lore, review of Volume IV,
222-225.
Bird of Washington, 382.
Bittern, American, 280.
Least, 263.

Bishop, L. B., see Sanford, L. C.
Blacicus blancoi, 11, 194.
Blackbird, Bicolored, 186.
 Brewer's, 46, 186, 206.
 Red-winged, 46, 206.
 San Diego Red-winged, 186.
 Tri-colored, 186.
 Yellow-headed, 46, 186, 282.
 Yellow-shouldered, 12, 206.
Blackbirds, 255-257.
Blatchley, W. S., notice of his 'A Nature Wooring at Ormond by the Sea,' 83.
Bluebird, 70, 261.
 Mountain, 103, 209.
Bob-white, 161-164, 252, 263.
Bolborhyncus, 311.
Bonasa umbellus togata, 281.
 umbellus umbelloides, 281.
Bonhote, J. Lewis, bird migration at some of the Bahama Lighthouses, 169-179; notice of his 'Field Notes on Some Bahama Birds,' 230; notice of his 'On a Collection of Birds from the Northern Islands of the Bahama Group,' 447.
Booby, White, 287.
 Laysan, 385.
Botaurus lentiginosus, 22, 280.
Bowdish, B. S., birds of Porto Rico, 10-23; food habits of some West Indian birds, 193-195.
Brachyrhampus craveri, 79.
 hypoleucus, 79.
Braislin, William C., notes concerning certain birds of Long Island, N. Y., 50-53.
Brant, 439.
Branta bernicla, 439.
 canadensis, 280, 439.
Breninger, Geo. F., Western Evening Grosbeaks nesting in Mexico, 68; Sabine's Gull at Monterey, California, 433; nests and eggs of *Cæligena clemenciae*, 435.
Brewster, William, breeding grounds of the Black and Socorro Petrels—a correction, 63; review of his 'Birds of the Cape Region of Lower California,' 78-80; further notes on the Philadelphia Vireo, with description of the nest and eggs, 369-376; an interesting Solitary Vireo (*Vireo solitarius*), 437.
Brooks, Allan, notes on the birds of the Cariboo District, British Columbia, 277-284.
Brown, Herbert, Arizona bird notes, 43-50.
Bryan, William Alanson, a Turnstone taken in the Mid-Pacific, 210; the Short-eared Owl (*Asio accipitrinus*) taken far out at Sea, 212.
Bubo, 273.
 virginianus arcticus, 364.
 virginianus elachistus, 79, 341.
 virginianus pallescens, 205.
 virginianus saturatus, 183.
 virginianus subarcticus, 364.
Bubotus, 274.
Bucco bicuspidatus, 289.
Budyanthus, 450.
Buffle-head, 279.
Bunting, Henslow's, 232.
 Lazuli, 190, 207.
Burroughs, John, notice of his 'John James Audubon,' 85.
Burtis, Henry Mott, the Dovekie (*Alle alle*) on Long Island, N. Y., 209; Barn Owl on Long Island, N. Y., 212.
Buteo albicaudatus, 288.
 borealis, 269.
 borealis calurus, 79, 183, 205.
 borealis lucasanus, 79, 339.
 borealis socorroensis, 364.
 borealis umbrinus, 364.
 lineatus, 269.
 platypterus, 23.
 swainsoni, 44.
Buteola, 360.
Butorides, 334.
 virescens, 49, 334.
 virescens anthonyi, 334.
 virescens frazari, 334.
Buzzard, White-tailed, 288.
CACATUA gymnopis, 460.
Caica, 311.
Calandrina, 450.
Calidris arenaria, 22, 280.
Calypte anna, 184.
Canachites canadensis, 359.
 canadensis canace, 359.
 canadensis osgoodi, 359.
 franklini, 281.
Canvas-back, 278.
Caprimulgus, 360.
Cardellina rubrifrons, 75.
Cardinal, 54, 257.

Cardinalis cardinalis, 54.
cardinalis cardinalis, 295.
Carpodacus cassini, 187, 282.
clementis, 33.
mexicanus frontalis, 167, 187, 217.
mexicanus obscurus, 217.
purpureus, 264.
purpureus californicus, 187.
Cassinia, see Delaware Valley Ornithological Club.
Catbird, 208, 261, 284.
Catharista urubu, 67, 287.
Cathartes aura, 53, 66, 183, 205.
Catherpes, 196.
mexicanus, 196.
mexicanus albifrons, 196.
mexicanus conspersus, 198.
mexicanus mexicanus, 196.
mexicanus polioptilus, 197.
mexicanus punctulatus, 197.
Centrocercus urophasianus, 204.
Centurus, 342.
aurifrons, 342.
carolinus, 342.
nyeanus, 434.
uropygialis, 43, 44, 342.
Ceophloëus pileatus, 282.
pileatus abieticola, 184.
Certhneis, 339.
sparverius paulus, 364.
Certhia albifrons, 196.
familiaris americana, 266.
familiaris zelotes, 192.
palustris, 356.
Certhidia, 402-404, 406, 410, 412-416.
olivacea luteola, 411.
Ceryle alcyon, 170, 183.
Chamæpa *passerina*, 177, 359.
Chamæthlypis, 75.
Chamberlain, Montague, see Nuttall, Thomas.
Chapman, Frank M., notice of his 'The Economic Value of Birds to the State,' 453.
Charadrius dominicus, 22, 281.
fulvus, 174.
montanus, 338.
wilsonia, 338.
Charitonetta, 359.
albeola, 279.
Chat, 266.
Long-tailed, 208.
Cheiroxiphia lanceolata, 291.
Chen hyperborea, 22.
hyperborea nivalis, 22.
Chewink, 216.
Chickadee, Barlow's, 359.
Mountain, 192.
Oregon, 208.
Chlorion, 450.
Chlorostilbon caribbæa, 290.
Chondestes grammacus, 440.
grammacus strigatus, 207.
Chordeiles henryi, 206.
minor, 23, 43¹.
virginianus, 184, 264, 324, 434.
virginianus chapmani, 432.
virginianus minor, 432.
virginianus vicinus, 431.
Chuck-bird, 258.
Cinclus cinclus, 291.
mexicanus, 192.
Cinnamopteryx, 450.
Circus hudsonius, 205.
Cistothorus griseus, 356.
mariannæ, 357.
palustris dissæptus, 367.
palustris paludicola, 356.
palustris plesius, 208, 357.
Clangula clangula, 359.
clangula americana, 279.
glaucion, 359.
islandica, 279.
Clark, Austin H., notes on the habits of certain Venezuelan birds, 285-293; the Black-winged Palm Tanager, 398-402.
Clark, J. H., a much mated House Sparrow, 306.
Clark, John N., the domestic affairs of Bob-white, 161-164; obituary notice of, 242.
Cleckley, M. T., nest and eggs of the Swainson's Warbler (*Helinaia swainsonii*), 438.
Coccothraustes, 346.
ruber, 295.
vespertinus, 213.
vespertinus montanus, 68, 187.
Coccyzus americanus, 68, 147, 179.
erythrophthalmus, 23.
Cocornis, 402-406, 410, 412-416.
agassizii, 411.
Cœligena clemenciae, 435.
Cœræba portoricensis, 17.
Colaptes auratus, 254, 282.
cafer collaris, 184, 205, 282.
chrysocaulosus, 194.

Colinus virginianus, 263.
 Columba corensis, 23.
 inornata, 23.
 leucocephala, 174.
 migratoria, 252.
 Columbigallina passerina pallidens, 360.
 passerina terrestris, 359.
 Columbidae, 363.
 Columbus auritus, 278.
 dominicensis, 21.
 holbællii, 278.
 Compsothlypis americana, 18.
 americana ramalinae, 74, 367.
 nigrilora, 367.
 pitayuma nigrilora, 367.
 Condor, The, review of Volume IV, 319-322.
 Contopus, 365.
 borealis, 184.
 richardsonii, 184.
 richardsoni saturatus, 365.
 Conuropsis, 451.
 Conurus æruginosus, 287.
 maugei (?), 20.
 Cooley, R. A., Wood Ibis in Montana, 210.
 Coot, American, 280.
 Corax, 450.
 Cormorant, Brandt's, 32.
 Farallone, 32.
 Corvus americanus, 57, 269-271.
 corax sinuatus, 33.
 leucognaphalus, 11.
 ossifragus, 269-271.
 Coturniculus, 349.
 bairdii, 349.
 savannarum bimaculatus, 349.
 savannarum floridanus, 350.
 savannarum passerinus, 349.
 Coues's 'Key to North American Birds,' publishers' announcements respecting a new edition of, 97, 244.
 Cowbird, Dwarf, 46.
 Crane, 251.
 Sandhill, 280.
 Whooping, 252.
 Creeper, Brown, 266.
 Sierra, 192.
 Crossbill, American, 264.
 Sierra, 187.
 Crow, American, 206, 255.
 Australian Piping, 444.
 Common, 57, 267-271.
 Clark, 220.
 Clarke, 221.

Crow, Fish, 269-271.
 West Indian, 11.
 Cryptoglaux, 364.
 Cuckoo, Yellow-billed, 68.
 Curlew, Hudsonian, 33.
 Long-billed, 281.
 Cyanocitta couchii, 345.
 stelleri borealis, 362.
 stelleri carbonacea, 220, 365.
 stelleri frontalis, 185.
 Cyanospiza amœna, 190, 207.
 cyanea, 173.
 Cyclorrhynchus, 359.
 Cygnus, 359.
 Cyphornis, 450.
 Cypseloides niger, 282.
 Cyrtonyx montezumæ, 338.
 montezumæ mearnsi, 338.

DAFILA acuta, 22, 164, 278, 303.
 Daggett, F. S., see Grinnell, J.
 Deane, Ruthven, additional records of the European Widgeon (*Mareca penelope*) in Indiana, 303; Richardson's Owl (*Nyctala tengmalmi richardsoni*) in Illinois, 305, 433.
 Degen, Edward, notice of his memoir 'Ecdysis, as morphological evidence of the original tetradactyle feathering of the bird's fore-limb, based on the perennial moult in *Gymnorhina tibicen*,' 444-446.
 Delaware Valley Ornithological Club, notice of its annual, 'Casinia,' 231; notice of annual meeting of, 328.
 Dendragapus obscurus fuliginosus, 182.
 obscurus richardsoni, 280.
 Dendrocygna arborea, 22.
 Dendroica, 217.
 adelaidæ, 18.
 æstiva, 208.
 æstiva morcomi, 191.
 auduboni, 191, 284.
 auduboni nigrifrons, 355.
 blackburnæ, 266.
 cærulea, 169, 171, 216, 367.
 cærulescens, 23, 171.
 carbonata, 74.
 coronata, 18, 171, 178.
 coronata hooveri, 191.
 discolor, 19, 171.
 dominica, 23, 171.
 evelynæ, 169.

Dendroica kirtlandi, 225, 459.
 maculosa, 18, 284.
 montana, 74, 361.
 nigrifrons, 355.
 occidentalis, 191.
 palmarum, 18, 171, 178, 265.
 petechia bartholemica, 18.
 rara, 216, 266, 367.
 striata, 23, 171, 177, 284.
 tigrina, 18, 171, 218.
 townsendi, 191.
 virens, 265, 361.

Dendroplex longirostris, 291.

Dichromana, 333.
 rufescens, 333.

Dickcissel, 440.

Diomedea immutabilis, 385.
 nigripes, 385.

Dipper, American, 192.

Doleromyia pallida, 290.

Dolichonyx oryzivorus, 170, 179.

Doran, Edwin W., the vernacular names of birds, 38-42.

Dorichia evelynae, 174.

Dove, Common Ring, 228.
 Mourning, 182, 205, 248, 263, 281.
 Red Ring, 228.

Dovekie, 51, 209.

Dresser, H. E., notice of his 'A Manual of Palaeartic Birds,' 441.

Dryobates lucanus, 365.
 pubescens, 255.
 pubescens gairdneri, 221.
 pubescens homorus, 221, 282, 360.
 pubescens leucurus, 221, 360.
 pubescens nelsoni, 221.
 pubescens oreocucus, 221.
 pubescens turati, 221, 341.
 scalaris lucanus, 365.
 villosus, 255, 264.
 villosus hyloscopus, 183, 281.
 villosus leucomelas, 281.

Dubois, Alphonse, notice of parts XI and XII of his 'Synopsis Avium,' 321.

Duck, American Scaup, 165.
 Black, 64.
 Canvas-back, 278.
 Harlequin, 278.
 Hybrid, 269.
 Lesser Scaup, 278.
 Pintail, 164, 251, 278.
 Red-legged, 226.
 Ring-necked, 279.

Duck, Ruddy, 280.
 Scaup, 278.
 Shoveller, 164, 278.

Durfee, Owen, Massachusetts breeding dates for *Bartramia longicauda*, 65; another record of *Thryothorus ludovicianus* in Massachusetts, 69.

Dutcher, William, the Barn Owl on Long Island, 67; Report of the A. O. U. Committee on the Protection of North American Birds, 101-159; the Educational Leaflets of the National Committee of Audubon Societies, 248.

Dutcher, William, and W. L. Baily, a contribution to the life history of the Herring Gull (*Larus argentatus*) in the United States, 417-431.

Dwight, Jonathan, Jr., capture of the Barn Owl (*Strix pratincola*) on Long Island, New York, 434; some new records for Nova Scotia, 439; formalin fails as an insecticide for *Dermestes*, 440.

EAGLE, Bald, 33, 264.
 Golden, 67, 183, 439.

Eaton, Elon Howard, an epidemic of roup in the Canandaigua Crow Roost, 57-59; a hybrid Duck, 64.

Electus westermanni, 460.

Ectopistes migratorius, 66.

Edwards, Stanley W., Yellow-billed Cuckoo's egg in a Robin's nest, 68.

Egret, 119.

Egretta, 333.
 candidissima, 333.
 ruficollis, 334.

Emberiza bairdii,
 hyemalis, 258.
 rostrata, 348.
 sandwichensis, 347.

Emerald, Atala's, 290.

Empidonax acadicus, 169, 174.
 difficilis, 206, 360.
 hammondi, 185.
 insulicola, 360.
 trailli, 185.
 trailli alnorum, 68, 282.
 virescens, 174.

Eremophila b. leucomela, 343.

Ereunetes pusillus, 22, 280.

Ergaticus ruber, 75.

Eribates, 451.

Erismatura jamaicensis, 22, 204, 280.
Erolia, 337.
 ferruginea, 337.
 variegata, 337.
Eubates, 451.
Eulampis holosericeus, 23.
Euphonia sclateri, 14.

FALCATOR, 450.
Falco anatum anatum, 33.
 columbarius, 23, 339.
 columbarius richardsonii, 67, 364.
 harrisi, 231.
 peregrinus anatum, 23.
 richardsonii, 364.
 rupicolus, 339.
 sparverius deserticolus, 183, 205, 339.
 sparverius phalœna, 339.
Faxon, Walter, a rare work on American ornithology, 236-241.
Felger, A. H., the Wood Ibis again in Colorado, 65; birds killed by hailstones, 70; hybrid duck — Mallard (*Anas boschas*) + Pintail (*Dafila acuta*), 303.
Finch, California Purple, 187.
 Cassin's Purple, 187, 282.
House, 70, 167, 187.
Laysan, 384, 387-389.
Purple, 264.
San Clemente House, 33.
Fisher, A. K., notice of his 'Partial List of the Birds of Keam Canyon, Arizona,' 318.
Fisher, Walter K., notice of his description of a new Tern from Neckar Island, 230; notes on the birds peculiar to Laysan Island, Hawaiian Group, 384-396.
Fisher, William H., nesting of the Red-bellied Woodpecker in Harford County, Md., 305.
Fisher, William Hubbell, preserving equilibrium by the use of one wing, 167-168.
Flamingo, 119.
Fleming, J. H., recent records of the Wild Pigeon, 66; Turkey Vulture at Moose Factory, James Bay, 66; breeding of the Evening Grosbeak in captivity, 213-215.

Flicker, 254, 282.
 Red-shafted, 184, 205, 282.
Florida, 334.
 cærulea, 334.
Flycatcher, Alder, 68, 282.
 Antillean Crested, 11.
 Ash-throated, 44.
 Hammond's, 185.
 Lower California, 342.
 Olive-sided, 184.
 Small-headed, 74.
 Taylor's 10.
 Traill's, 185.
 Western Yellow-bellied, 206.
Fratercula arctica, 50.
Fregata, 323.
 aquila, 285, 385.
Fringilla frontalis, 217.
 melodia, 350.
 meruloides, 221.
 passerina, 349.
 vespertina, 346.
 savana, 347.
Fulica americana, 22, 204, 280.
Fulmarus glacialis minor, 331.

GADWALL, 278.
Galeoscoptes carolinensis, 208, 284.
Gallinago delicata, 22, 280.
 major, 364.
 media, 364.
Gallinula, 167.
Gannet, Booby, 285.
Garzetta, 333.
 candidissima, 22.
Gavia imber, 278.
Geospiza crassirostris, 411.
 conirostris conirostris, 417.
 fortis, 407.
 fortis dubia, 417.
 fortis fortis, 407.
 fuliginosa, 407.
 fuliginosa acutirostris, 408.
 fuliginosa parvula, 408.
 habeli, 417.
 propinqua, 407.
 prosthemelas, 417.
 scandens, 407.
 scandens fatigata, 409.
 strenua, 407.
Geothlypis agilis, 266.
 exigua, 75.
 flavida, 75.
 formosa, 439.
 incompta, 75.
 nelsoni microrhyncha, 75.
 philadelphia, 266.

Geothlypis poliocephala, 355.
poliocephala ralphi, 75, 355.
tolmiei, 191.
trichas, 23, 76, 172, 178.
trichas arizela, 363.
trichas occidentalis, 191, 208.
trichas scripcola, 76, 363.
trichas sinuosa, 355.

Geotrygon chrysia, 339.

Gingala, 450.

Glaucidium gnoma, 183.
gnoma californicum, 281.

Gnatcatcher, Blue-gray, 69.

Golden-eye, American, 279.
Barrow's, 279.

Goldfinch, American, 206, 211.
Arizona, 222.
Arkansas, 188, 222.

Goose, Canada, 280, 439.
Emperor, 165.
Hawaiian, 167.
Hutchins's, 280.
White-fronted, 52.

Goshawk, American, 53.
Western, 183.

Grackle, Short-winged, 12.

Gracula quiscula, 256.

Grassquit, 14.
Bryant's, 14.

Grebe, Holbæll's, 278.
Horned, 278.
Pied-billed, 49, 279, 439.
Western, 50, 114, 279.

Green, Nat. S., Ohio notes, 70, 309.

Grinnell, J., and F. S. Daggett, an ornithological visit to Los Coronados Islands, Lower California, 27-37.

Grosbeak, Black-headed, 190.
California Pine, 187.
Evening, 213.
Porto Rico, 13.
Western Evening, 68, 187.

Grouse, Canadian Ruffed, 281.
Columbian Sharp-tailed, 204, 281.
Franklin's, 24, 281.
Gray Ruffed, 24, 281.
Richardson's, 24, 281.
Ruffed, 252.
Sooty, 182.

Grus americana, 252.
mexicana, 280.

Guara alba, 22.

Guillemot, Black, 130.

Gull, Black-backed, 132, 303.
Gull, Black-headed, 148.
Bonaparte's, 278.
Heermann's, 30.
Herring, 128, 129, 130, 132, 133, 417-431.
Laughing, 127, 136, 148.
Little, 52.
Sabine's, 433.
Western, 30.

Gygis alba kittlitzii, 385.

Gymnorhina tibicen, 444.

Hæmatopus bachmani, 33, 36.
frazari, 29, 36.
niger, 36.
palliatus, 36.

Haliæetus leucocephalus, 264.
leucocephalus leucocephalus, 33.

Harelda hyemalis, 279.

Harvey, Gertrude Fay, the diary of a Cardinal's nest, 54-57.

Hawk, Black, 269.
Cooper's, 183, 205.
Desert Sparrow, 183, 205.
Duck, 33.
Marsh, 205.
Swainson's, 44.
Red-shouldered, 269.
Red-tailed, 269.
Western Red-tailed, 183.
Western Sharp-shinned, 183.

Hazel-hen, 252.

Heleodytes brunneicapillus, 361.
brunneicapillus anthonyi, 367.
brunneicapillus bryanti, 361.
brunneicapillus couesi, 367.

Helinaia swainsoni, 438.

Heller, Edmund, see Snodgrass, Robert Evans.

Helminthophila bachmani, 178.
celata, 283.
celata lutescens, 190.
cincinnatensis, 74.
lawrencei, 50, 53, 74.
leucobronchialis, 74.
peregrina, 283.
rubricapilla gutturalis, 190.

Helmitheros, 355.

Helmintherus, 355.
swainsoni, 169, 171.

Helodromas solitarius cinnamomeus, 281.

Hen, Marsh, 147, 148.
Mud, 167.
Sage, 204.

Hendrickson, W. F., a winter record for the Chewink on Long Island, N. Y., 216.

Henninger, W. F., Golden Eagle, in middle southern Ohio, 67; Barn Owl in northern Ohio, 67; notice of his 'Preliminary List of the Birds of Middle Southern Ohio,' 83.

Henshaw, H. W., review of his 'Birds of the Hawaiian Islands,' 80; occurrence of the Emperor Goose in Hawaiiia, 164-167.

Herodias, 333.

 egretta, 333.

Heron, Black-crowned Night, 263.

 Great Blue, 116.

 Little Green, 49.

 Night, 167.

 Ward's, 332.

Hesperiphona, 346.

 vespertina, 347.

 vespertina montana, 347.

Hesperocichla naevia, 193.

Heteractitis incanusa, 33.

Himantopus mexicanus, 22.

Himatione freethi, 384, 387, 389.

Hirundo bicolor, 354.

 erythrogaster, 23, 209, 221, 363.

 erythrogaster palmeri, 190, 363.

 erythrogaster unalaschken-sis, 221.

 pelasgia, 260.

 purpurea, 260.

 riparia, 260.

 rustica, 259.

 tytleri, 221.

Histrionicus histrionicus, 279.

Hittock, 254.

Hoatzin, 228.

Hoffmann, Ralph, nesting of the Goshawk in southern New Hampshire, 211.

Holociscalus, 75.

Holub, Emil, obituary notice of, 92.

Honey-eater, Laysan, 384, 389.

Horizopus, 365.

Horton, Frances B., mortality of Purple Martins (*Progne purpura*) at Brattleboro, Vt., 435.

Howe, Reginald Heber, Jr., a correction, 210; a further note on the subspecies of *Passerulus sandwichensis* inhabiting Labra-

dor, 215; late records for eastern Massachusetts, 218; Nighthawk migration in New Hampshire, 434.

Howe, Reginald Heber, Jr., and Edward Sturtevant, notice of their revised list of the birds of Rhode Island, 446.

Huhus, 450.

Hummingbird, Alice's, 290.

 Allen's, 282.

 Anna, 184.

 Blue-throated, 435.

 Broad-tailed, 184.

 Buff-breasted, 290.

 Calliope, 282.

 Ruby-throated, 253.

 Rufous, 184.

Huntington, Dwight W., notice of his 'Our Feathered Game,' 443.

Hydranassa, 334.

 tricolor ruficollis, 22, 334.

Hydrochelidon nigra surinamensis, 22, 440.

Hylocichla alicae, 266.

 aonalaschkae sequoiensis, 192.

 aonalaschkae slevini, 368.

 guttata nana, 79.

 guttata pallasi, 284.

 pallasi, 266.

 ustulata, 192, 368.

 ustulata cedica, 368.

 ustulata swainsoni, 284.

Hylophilus, 447.

Ibis, Wood, 65, 119, 210.

Icteria virens, 266.

 virens longicauda, 208.

Icterus auduboni, 75, 365.

 bullocki, 206.

 galbula, 440.

 icterus, 12, 75, 292.

 melanocephalus auduboni, 365.

 portoricensis, 12.

 xanthornus helioides, 292.

Ionornis martinica, 22.

Iridoprocne, 354.

 bicolor, 354.

JACANA spinosa, 22.

Jacobs, J. Warren, notice of his 'The Story of a Martin Colony,' 226.

Jay, Blue, 308.

 Blue-fronted, 185.

Jay, Couch's, 345.
 Johnson, W. S., Great Black-backed Gull in Oneida County, N. Y., 303.
 Junco annectens, 366.
 caniceps, 366.
 dorsalis, 366.
 hyemalis, 265.
 hyemalis connectens, 366.
 hyemalis pinosus, 366.
 hyemalis thurberi, 189, 366.
 mearnsi, 366.
 oreganus pinosus, 366.
 oreganus shufeldti, 366.
 oreganus thurberi, 366.
 phænotus dorsalis, 366.
 Junco, 265.
 Sierra, 189.

KENOPIA, 450.
 Keyser, Leander, notice of his 'Birds of the Rockies,' 84.
 Killdeer, 263, 281.
 King, LeRoy, early record for the Piping Plover (*Ægialitis melanotos*) in Rhode Island, 305.
 Kingbird, 266.
 Arkansas, 206.
 Gray, 10, 194.
 Kingfisher, Belted, 171, 183, 205,
 Kinglet, Ruby-crowned, 192, 218.
 284.
 Western Golden-crowned, 192.
 Knight, Wilber C., notice of his 'The Birds of Wyoming,' 82; obituary of, 457.
 Knox, J. C., some suggestions, 234.
 Kopman, H. H., Louisiana migration notes, 309.
 Kumlien, Ludwig, obituary notice of, 93.

LAGOPUS leucurus, 281.
 leucurus peninsularis, 364.
 Lampornis viridis, 23.
 Lanius ludovicianus, 361.
 ludovicianus anthonyi, 361.
 ludovicianus excubitorides, 208, 361.
 ludovicianus gambeli, 361.
 ludovicianus migrans, 367, 439.
 Lark, California Horned, 344.
 Desert Horned, 343.
 Dusky Horned, 185, 206, 282.
 Hoyt's Horned, 344.
 Island Horned, 345.

Lark, Montezuma Horned, 344.
 Pallid Horned, 282, 343.
 Larus argentatus, 363, 417.
 crepidatus, 449.
 glaucus, 165.
 heermanni, 30.
 marinus, 303.
 minutus, 50, 52.
 occidentalis, 30.
 philadelphia, 226, 278.
 vegæ, 363.
 Laysan Island, birds of, 384-402.
 Leptotila brachyptera, 364.
 fulviventris brachyptera, 364.
 Leucosticte tephrocotis, 187, 282.
 tephrocotis littoralis, 282.
 Leucosticte, Gray-crowned, 187, 282.
 Hepburn's, 282.
 Limosa fedoa, 22.
 Loomis, Leverett Mills, recognition of geographic variation in nomenclature, 294-299.
 Loon, 278.
 Lophodytes cucullatus, 278.
 Lophophanes, 308, 357.
 cristatus, 308.
 dichrous, 308.
 inornatus cinereaceus, 358.
 inornatus griseus, 358.
 wollweberi, 358.
 Loxia cardinalis, 257.
 curvirostra bendirei, 187, 365.
 curvirostra minor, 264.
 frontalis, 218.
 Loxigilla portoricensis, 13.
 Luscineola mimica, 324.

MACKAY, George H., Woodcock notes, 210.
 Macoun, John, notice of his 'Catalogue of Canadian Birds,' Part II, 441.
 Madarász, Julius, notice of his 'Birds of Hungary,' 322.
 Magpie, American, 185, 206.
 Maize-thieves, 256, 257.
 Purple, 257.
 White-backed, 257.
 Mallard, 64, 210, 278, 303.
 Manacus candei, 324.
 Manakin, Lance-tailed, 291.
 Mareca americana, 22, 278.
 penelope, 210, 225, 303.
 Margarops fuscatus, 20, 177.
 Martin, Purple, 226, 260, 265, 435.
 Sand, 260, 435.
 West Indian, 15.

Maxon, William R., notes on the birds of Madison County, New York, with especial reference to Embdy's recent list, 262-266.

McGregor, Richard C., notice of 'A List of Birds collected in Norton Sound, Alaska, 319; notice of his papers on various Philippine birds, 319.

McIlwraith Ornithological Club, 98.

McIlwraith, Thomas, obituary notice of, 242.

McKechnie, Fred. B., a late fall record for the Cape May Warbler (*Dendroica tigrina*) in eastern Massachusetts, 218.

Meadowlark, 248.

- Southern, 345.
- Western, 186, 206.

Mearns, Louis di Zerega, the Louisiana Water-thrush in Minnesota, 307.

Megascops, 275.

- xantusi, 79, 341.

Megaquiscalis, 451.

Megaquiscalus, 75, 346, 451.

- major, 346.
- major macrourus, 346.

Melanerpes angustifrons, 365.

- carolinus, 255, 264, 305.
- erythrocephalus, 70, 255.
- formicivorus angustifrons, 79, 365.
- portoricensis, 193.
- subelegans, 290.
- superciliaris, 194.
- torquatus, 184, 205.

Melanopteryx, 450.

Meleagris gallopavo fera, 338.

- gallopavo intermedia, 364.
- gallopavo merriami, 364.
- gallopavo silvestris, 339.
- silvestris, 338.

Melospiza cinerea, 298, 350, 362.

- cinerea caurina, 352.
- cinerea clementæ, 37, 351.
- cinerea cooperi, 352, 363.
- cinerea fallax, 350.
- cinerea gouldi, 362.
- cinerea graminea, 351.
- cinerea heermannii, 350.
- cinerea insignis, 353.
- cinerea juddi, 352.
- cinerea kenaiensis, 353.
- cinerea melodia, 350.
- cinerea merrilli, 352, 362.

Melospiza cinerea montana, 189, 350.

- cinerea morphna, 351.
- cinerea phæa, 366.
- cinerea pusillula, 352.
- cinerea rivularis, 351.
- cinerea rufina, 351.
- cinerea samuelis, 351, 362.
- coronatorum, 34, 37, 366.
- fasciata caurina, 353.
- fasciata clementæ, 351.
- fasciata cooperi, 352.
- fasciata graminea, 351.
- fasciata ingersolli, 362.
- fasciata juddi, 352.
- fasciata merrilli, 352.
- fasciata montana, 350.
- fasciata pusillula, 352.
- heermannii, 350.
- insignis, 353.
- lincolni, 189, 265.
- lincolni striata, 283.
- melodia, 350.
- melodia kenaiensis, 353.
- melodia montana, 207.
- melodia morphna, 351.
- melodia santæcrucis, 362.
- melodia sanaka, 362.

Merganser americanus, 278.

- serrator, 165.

Merganser, American, 278.

- Hooded, 278.
- Red-breasted, 165.

Merlin, Richardson's 67.

Merrill, James Cushing, notice of death of, 90.

Merula migratoria propinqua, 193, 209.

Micranous hawaiiensis, 385.

Michigan Ornithological Club, organization of, 244.

Micropalama himantopus, 22, 65, 440.

Micropallas whitneyi, 43.

Miller, W. D. W., breeding of the Alder Flycatcher (*Empidonax traillii alnorum*) near Plainfield, N. J., 68.

Mimidae, 367.

Miminae, 367.

Mimocichla ardosiaecea, 20.

Mimus caudatus, 295.

- polyglottos, 53, 295, 440.
- polyglottos leucopterus, 295.
- polyglottos orpheus, 19.
- polyglottos polyglottos, 295.
- polyglottosvar. caudatus, 295.

Miserythrus, 450.

Mniotilla varia, 17, 170, 178, 265.
Moa, eggs of, 330.
Mockingbird, 53, 260, 440.
 West Indian, 19.
Mogridge, Mrs. E. S., obituary notice of, 327.
Morris, Robert O., Springfield, Mass., bird notes, 439.
Motacilla cærulea, 217.
 cyanea, 449.
 sialis, 261.
Mudge, Geo. P., notice of his 'Myology of the Tongues of Parrots,' etc., 310.
Murres, Brünnich's, 51.
Muscicapa carolinensis, 261.
 minuta, 74.
Myadestes townsendi, 192.
Myiarchus antillarum, 11, 194.
 cinerascens, 44, 79.
 cinerascens pertinax, 342.
 pertinax, 342.
 crinitus residuus, 365.

NANOPTERUM, 323.
Nebraska Ornithologist's Union, notice of the Proceedings of the Third Annual Meeting, 317; notice of Fourth Annual Meeting, 329.
Nesospingus speculiferus, 14.
Nettion carolinensis, 209, 278.
 crecca, 209.
New York Zoological Society, Seventh Annual Report of, 330.
Nighthawk, 184, 248, 264, 434.
 Bahaman, 431-433.
 Western, 206.
Noddy, 385.
North, Alfred J., notice of his 'Nests and Eggs of Birds found Breeding in Australia and New Zealand,' 321.
Nucifraga columbiana, 185.
Numenius borealis, 22.
 hudsonicus, 22, 33.
 longirostris, 281.
Nutcracker, Clark's, 180, 185.
Nuthatch, Pygmy, 192.
 Red-breasted, 192.
 Rocky Mountain, 357.
 Saint Lucas, 357.
 Slender-billed, 192.
Nuttall, Thomas, notice of the "new revised and annotated edition" of his 'A Popular Handbook of the Birds of the United States and Canada,' 314.

Nuttallornis, 343.
 borealis, 343.
Nyctala, 364.
 acadica, 183.
 tengmalmi richardsoni, 281, 305, 433.
Nyctalops, 274.
 accipitrinus, 275.
 wilsonianus, 275.
Nyctanassa, 335.
 violacea, 335.
Nyctiardea violacea, 174.
Nycticorax nævius, 22, 448.
 nycticorax nævius, 263.
Oberholser, Harry C., a review of the genus *Catherpes*, 196-198; a synopsis of the genus *Psaltriparus*, 198-201; notice of his papers on new birds from Texas, 447.
Oceanites oceanicus, 65, 250.
Oceanodroma fuliginosa, 386.
 leucorhoa, 250.
 melania 30, 36.
 socorroensis, 31, 36.
Ochthodromus, 338.
 wilsonius, 338.
Oidemia deglandi, 280.
 perspicillata, 280.
Olor, 359.
 buccinator, 280.
 columbianus, 52.
Oporonis, 75.
 agilis, 172.
Oreortyx pictus plumiferus, 182.
Oreospiza chlorura, 190.
Oriole, Baltimore, 70, 440.
 Bullock's 206.
 Margaritan, 292.
 Porto Rico, 12.
Oriolus phoeniceus, 257.
Oroscoptes montanus, 208.
Orpheus leucopterus, 295.
Ortholophus, 324.
Ortyx capistratus, 239.
Osprey, The, notice of Vol. I, new series, 451.
Otocoris alpestris, 236.
 alpestris actia, 344.
 alpestris ammophila, 362.
 alpestris aphrasta, 365.
 alpestris arcticola, 343.
 alpestris arenicola, 343.
 alpestris chrysolæa, 344.
 alpestris enthymia, 362.
 alpestris hoyti, 344.
 alpestris insularis, 345.
 alpestris leucansiptila, 362.

Otocoris alpestris leucolæma, 282, 343.
alpestris merrillii, 185, 206, 282.
alpestris occidentalis, 344.

Otus, 273.
asio, 275.
asio aikeni, 275.
asio bendirei, 275.
asio cinereaceus, 275.
asio floridanus, 275.
asio kennicottii, 275.
asio macfarlanei, 275.
asio maxwelliae, 275.
asio mccallii, 275.
bakkamæna, 273.
flammeola, 275.
flammeola idahoensis, 275.
trichopsis, 275.

Oven-bird, 19.

Owl, American Long-eared, 205.
Barn, 67, 212, 434.
Barred, 340.
Burrowing, 205, 288.
California Pygmy, 281.
Dusky Horned, 183.
Dwarf Horned, 341.
Elf, 43.
Great Gray, 340.
Pygmy, 183.
Richardson's, 281, 305, 433.
Saw-whet, 183.
Short-eared, 212.
Western Horned, 205.
Xantus's Screech, 341.

Oxyechus, 337.
vociferus, 337.

Oxyporus, 450.

Oyster-catcher, Black, 33.
Frazar's, 33.

PACHYSYLVIA, 447.

Palæonornis, 450.

Parrot, Amazonian, 289.

Partridge, Painted, 182.
Virginia, 252.

Parula americana, 171, 178.

Parus atricapillus, 236.
atricapillus occidentalis, 208.
atricristatus, 358.
bicolor, 357, 358.
bicolor texensis, 358.
cristatus, 357.
gambeli, 192.
hudsonicus evura, 367.
hudsonicus littoralis, 367.
hudsonicus stoneyi, 367.

Parus, inornatus, 358.
melanotis, 199.
minimus, 200.

Passer domesticus, 306.
nivalis, 258.

Passerulus, 215, 347.
alaudinus, 348.
beldingi, 348.
guttatus, 348.
princeps, 347.
rostratus, 348.
rostratus guttatus, 348.
rostratus var. guttatus, 348.
rostratus halophilus, 348.
rostratus sanctorum, 349.
sanctorum, 349.
sandwichensis, 215, 347.
sandwichensis alaudinus, 348.
sandwichensis γ . alaudinus, 348.
sandwichensis bryanti, 348.
sandwichensis savanna, 347.

Passerella, 221.
iliaca, 218.
iliaca annectens, 221, 366.
iliaca fuliginosa, 366.
iliaca insularis, 366.
iliaca megarhynca, 189.
iliaca meruloides, 366.
iliaca townsendi, 366.
iliaca unalaschensis, 189.
rufina, 351.

Paulomagus, 446.

Pediocetes phasianellus columbianus, 204, 281.

Pelican, American White, 48.
Brown, 121, 285.
California Brown, 32.

Pelecanus, 323.
californicus, 32, 36, 363.
erythrorhynchus, 48.
fuscus, 285.
fuscus californicus, 363.
occidentalis, 363.

Pelidna, 337.
alpina, 337.
alpina pacifica, 337.
pacifica, 337.

Penelopides, 324.

Percnopterus, 451.

Perenopterus, 451.

Perisoreus canadensis, 361.
canadensis fumifrons, 360.
canadensis nigricapillus, 361.
canadensis obscurus, 361.
obscurus, 361.
obscurus griseus, 361.

Petrel, Black, 30, 63.

Petrel, Bonin, 386.
 Leach's, 250.
 Socorro, 31, 63.
 Sooty, 386.
 Wilson's, 65, 250.

Petrochelidon fulva, 15.
 lunifrons, 190, 207.
 lunifrons tachina, 447.

Peucedramus, 75.

Pewee, Western Wood, 184.

Phæopharus, 450.

Phaëthon, 323.
 aethereus, 22.
 rubricaudus, 385.

Phalacrocorax, 323.
 auritus, 363.
 auritus albociliatus, 32.
 bicristatus, 359.
 dilophus, 363.
 mexicanus, 363.
 pelagicus, 359.
 pelagicus robustus, 359.
 penicillatus, 32, 36.
 resplendens, 359.
 urile, 359.
 vigua mexicanus, 363.

Phalænoptilus nuttallii, 205.
 nuttallii californicus, 184.

Phalarope, Northern, 280.

Phalaropus lobatus, 280.

Phalerinæ, 363.

Phaleris, 359.

Philacte canagica, 165-167.

Philohela minor, 210.

Phœbe, Say's, 206.

Phœnicothraupis rubica nelsoni, 75.

Pica hudsonica, 185, 206.
 pica hudsonia, 345.
 pica hudsonica, 345.

Picicorvus, 361.

Picoides americanus, 282.
 arcticus, 282.
 arcticus tenuirostris, 365.
 tenuirostris, 184.

Picus aurifrons, 342.
 carolinus, 342.
 harrisi, 231.
 pileatus, 253.
 torquatus, 341.
 turati, 221, 341.

Pigeon, 66.
 Wild, 66, 252.

Pinaroloxias inornata, 232.

Pinicola californica, 187.

Pintail, 164, 278, 303.

Pipilo albogularis, 366.

Pipilo crissalis, 366.
 crissalis carolæ, 366.
 crissalis senicula, 366.
 erythrophthalmus, 216, 236, 265.
 fuscus albogularis, 366.
 fuscus carolæ, 367.
 fuscus crissalis, 366.
 fuscus senicula, 366.
 maculatus var. ? 207.
 maculatus atratus, 366.
 maculatus megalonyx, 366.

Pipilo, Abert's, 48.

Piranga ludoviciana, 190, 207.
 rubra, 169, 173.
 rubriceps, 75, 354.

Pitangus taylori, 10, 194.

Pitta angolensis, 324.
 pulith, 324.

Piut, 254.

Platycercus, 311.

Plegadis autumnalis, 22.

Plover, American Golden, 281.
 Black-bellied, 281.
 Piping, 305.
 Snowy, 433.

Podasocys, 338.
 montanus, 338.

Podicipidæ, 363.

Podilymbus podiceps, 278, 439.

Pectilonetta bahamensis, 22.

Polioptila, 217, 390.
 caerulea, 69.

Pomarimus, 450.

Poæetes gramineus, 283.
 gramineus confinis, 207.

Poor wi', 205.

Porphyrio martinica, 169, 175, 179.

Porzana carolina, 22, 175, 177, 280.
 coturniculus, 364.
 flaviventris, 22.
 jamaicensis, 22.

Porzanaula, 388.
 palmeri, 384, 392.

Procellaria pelagica, 250.
 puffinus, 250.

Procelsterna saxatalis, 230.

Progne dominicensis, 15.
 purpurea, 435.
 subis, 265, 363.
 subis floridana, 363.

Psaltria plumbea, 200.

Psaltriparus, 198.
 grindæ, 201, 368.
 melanotis iulus, 199.
 melanotis lloydii, 199.
 melanotis melanotis, 199.

Psaltriparus minimus, 362.
 minimus californicus, 201,
 362.
 minimus grindæ, 368.
 minimus minimus, 200.
 personatus, 199.
 plumbeus, 200.
 santaritæ, 199.
Psaltrites, 199.
 helviventris, 199.
Psittacula modesta, 213.
 modesta sclateri, 213.
 sclateri, 213.
Ptarmigan, 252.
 Rock, 281.
 White-tailed, 281.
Ptiliogonatidæ, 367.
Ptiliogonatinæ, 367.
Ptychoramphus aleuticus, 30.
Publications received, 89, 232, 324,
 453.
Puffbird, Two-banded, 289.
Puffin, 50, 131.
Puffinus bulleri, 332.
 cuneatus, 332, 386.
 fuliginosus, 250, 363.
 griseus, 363.
 major, 250.
 nativitatis, 386.
 puffinus, 250.
Pycraft, W. P., notice of his 'The
Significance of the Condition of
Young Birds at Birth', 227.
Pyrrhomitrîs cucullata, 23.
Pyrrhulopsis, 311.
QUERQUEDULA discors, 22, 278.
Quiscalus brachypterus, 12.
 macrourus, 346.
 major, 346.
RAIL, Clapper, 137.
 King, 304.
 Laysan, 384, 392-396.
 Sora, 280.
 Virginia, 280.
Rallus ecaudatus, 449.
 elegans, 304.
 levipes, 363.
 virginianus, 280.
Raven, American, 33.
Ray, Milton S., a list of the land
birds of Lake Valley, Central
Sierra Nevada Mountains, Califor-
nia, 180-193.
Ready, George H., obituary notice
of, 327.
Reagh, Arthur Lincoln, the King
Rail in Plymouth County, Mass.,
 304.
Red-bird, 257.
Redhead, 278.
Redpoll, Hoary, 282.
Redstart, American, 19, 208, 284,
 309, 310.
Regulus calendula, 192, 218, 284.
 satrapa olivaceus, 192.
Rhoads, S. N., *Auduboniana*, 377-
 383.
Rhodinicincla rosea eximea, 75.
Richmond, Charles W., notice of
paper by on birds from the
Andaman and Nicobar Islands,
229; notice of paper by on birds
from the coast and islands of
Northwest Sumatra, 230;
Ridgway, Robert, review of his
'Birds of North and Middle
America,' Part II, 73-76; *Lopho-
phanes* vs. *Baeolophus*, 308.
Riley, J. H., a new subspecies of
Nighthawk from the Bahama
Islands, 431-433; the Snowy
Plover in the Bahamas, 433;
the second known specimen of
Centurus nyeanus, 434.
Riparia riparia, 23, 436.
Robin, 248, 261.
 Western, 193, 209.
Robin-redbreast, 261.
SAGE, John H., Twentieth Con-
gress of the American Ornithol-
ogists' Union, 59-63.
Salpinctes obsoletus, 33, 208.
 obsoletus pulverius, 367.
 pulverius, 367.
Sanderling, 280.
Sandpiper, Baird's, 280.
 Bartramian, 65, 281.
 Least, 280.
 Pectoral, 280.
 Saint Lucas, 354.
 Semipalmated, 280.
 Spotted, 33, 281.
 Stilt, 65, 440.
 Western Solitary, 281.
Sanford, L. C., and L. B. Bishop
and T. S. Van Dyke, notice of
their 'The Water-Fowl Family,'
313.
Sapsucker, Red-naped, 282.
 Williamson's, 184.
 Yellow-bellied, 264.

Sayornis nigricans, 365.
 nigricans semiatra, 79, 365.
 saya, 206.

Scolecopagus cyanocephalus, 186,
 206.

Scotiaptex cinerea, 340.
 nebulosa, 340.
 nebulosa lapponica, 340.
 nebulosum, 340.

Scotothorus verapacis, 324.

Scops, 273.

Scopus, 273.

Scooter, Surf, 280.
 White-winged, 280.

Scott, William Earl Dodge, notice
 of his 'The Story of a Bird
 Lover,' 315.

Seaman, Ernest, balancing with
 one wing, 308.

Seed-eater, Morelet's, 353.

Seiurus aurocapillus, 19, 172.
 motacilla, 19, 172, 307.
 noveboracensis, 19, 172.
 noveboracensis notabilis, 284.

Selasphorus alleni, 282.
 platycercus, 184.
 rufus, 184.

Seth-Smith, David, notice of his
 'Parrakeets: being a Practical
 Handbook to those Species kept
 in Captivity,' 323.

Setophaga, 75.
 miniata, 75.
 ruticilla, 19, 173, 208, 284.

Shearwater, Christmas Island, 386.
 Greater, 250.
 Manx, 250.
 New Zealand, 332.
 Sooty, 250.
 Wedge-tailed, 332, 386.

Sherborn, Charles D., notice of
 his 'Index Animalium,' 448-450.

Shoveller, 164, 278.

Shrike, Migrant, 439.
 White-rumped, 208.

Shufeldt, R. W., notice of his
 papers on the Steganopodes, and
 on the Classification of certain
 Groups of Birds, 323.

Sialia arctica, 193, 209.
 sialis, 70.
 sialis grata, 368.

Simons, Perry O., obituary notice
 of, 94.

Simorhynchinae, 363.

Siskin, Pine, 188.

Sitta canadensis, 192.

Sitta carolinensis aculeata, 192.
 carolinensis lagunæ, 357.
 carolinensis nelsoni, 357.
 pygmæa, 192.
 syriaca, 225.

Sittidae, 367.

Sittinae, 367.

Slevin, Thomas Edwards, obituary
 notice of, 326.

Smith, Horace G., Bell's Vireo
 (*Vireo bellii*) in Colorado, 438.

Snipe, Wilson's, 280.

Snodgrass, Robert E., a list of land
 birds from Central Washington,
 202-209; notes on the anatomy
 of *Geospiza*, *Cocornis*, and *Cer-*
thidea, 402-417.

Snodgrass, Robert Evans, and Ed-
 mund Heller, notice of their
 paper on 'The Birds of Clipper-
 ton and Cocos Islands,' 81.

Snow, Francis H., notice of his 'A
 Catalogue of the Birds of Kan-
 sas' (fifth ed.), 317.

Snowbird, 258.

Solitaire, Townsend's, 192.

Sora, 280.

Sparrow, Alameda Song, 352.
 Brewer's, 189, 207.
 Coronados Song, 34.
 English, 70, 300, 309.
 Florida Grasshopper, 350.
 Forbush's, 283.
 Fox, 218.
 Grasshopper, 264.
 House, 306.
 Intermediate, 188.
 Kenai Song, 353.
 Lark, 440.
 Lincoln's, 189, 265.
 Monterey Fox, 221.
 Mountain Song, 189, 207.
 Sage, 207.
 San Diego, 352.
 Savanna, 283.
 Thick-billed, 189.
 Townsend, 189.
 Vesper, 283.
 Western Chipping, 188.
 Western Lark, 207.
 Western Tree, 283.
 Western Vesper, 207.
 West Indian Grasshopper,
 13.
 White-crowned, 188.
 White-throated, 265.

Spatula clypeata, 22, 164, 278.

Speotyto cunicularia becki, 365.
 cunicularia hypogaea brachyptera, 288.
Spermestes cucullatus, 13.
Spermophilus moreletti, 353.
Sphyrapicus thyroideus, 184.
 varius, 174, 253, 264.
 varius nuchalis, 282.
Spindalis portoricensis, 14.
Spinney, Herbert L., the Stilt Sandpiper in Knox County, Maine, 65.
Spinus pinus, 188.
Spiza americana, 440.
Spizella atrigularis, 447.
 breweri, 189, 207, 283.
 monticola ochraceus, 283.
 socialis arizonæ, 188.
Spoonbill, Roseate, 119.
Sporæginthus melpoda, 13.
Sporophila moreletti, 353.
 moreletti sharpei, 353.
Squatarola helvetica, 22.
 squatarola, 281.
Stare, Red-winged, 256.
Stelgidopteryx serripennis, 265.
Stellula calliope, 282.
Sterna acuflavida, 175.
 antillarum, 175.
 cantiaca, 175.
 dougalli, 21, 275.
 forsteri, 32.
 fuliginosa, 175, 179, 292, 385.
 lunata, 385.
 maxima, 21.
 regia, 219.
 sandvicensis acuflavida, 21.
Stercorarius cephus, 359.
 longicaudus, 359.
 parasiticus, 359.
Stilt, Black-necked, 115.
 Hawaiian 167.
Stone, Witmer, a hybrid Duck, *Anas boschas* \times *Nettion carolinensis*, 209; notes on winter Crow life in the Delaware Valley, 267-271; on the generic names of the North American Owls, 272-276; notice of his paper on a collection of birds from Sumatra, 318; notice of his paper on birds from southern New Mexico and western Texas, 447.
Strepsilas interpres, 174.
Strigidae, 360.
Striker, Big, 148.
 Little, 148.
Stringops, 311.
Strix, 272, 360.
 aluco, 272.
 arctica, 274.
 asio, 272.
 bakkamena, 273.
 bubo, 272, 274.
 flammea, 272.
 funera, 272.
 lapponica, 340.
 nebulosa, 340.
 nebulosa allenii, 340.
 nyctea, 272.
 otus, 272.
 passerina, 272.
 pratincola, 69, 212, 434.
 scandiacica, 272.
 scops, 272.
 stridula, 272.
 ulula, 272.
 varius, 340.
Strong, R. M., review of his paper on 'The Development of Color in the Definitive Feather,' 86-88; notice of paper by, on 'A Case of Abnormal Plumage,' 228.
Sturnella, 76.
 magna argutula, 345.
 magna hoopesi, 361.
 magna mexicana, 361.
 magna neglecta, 186, 206, 365.
 neglecta, 365.
Sturtevant, Edward, see Howe, Reginald Heber, Jr.
Sula, 323.
 cyanops, 385.
 piscator, 287, 385.
 sula, 285.
Surnia ulula, 364.
 ulula doliata, 364.
Swallow, Barn, 207, 259.
 Chimney, 259.
 Cliff, 190, 207.
 Cuban Cliff, 15.
 Ground, 260.
 House, 259.
 Northern Violet-green, 208.
 Rough-winged, 265.
 Sand, 436.
 Tree, 190.
 Violet-green, 190.
 Western Barn, 190.
Swan, Trumpeter, 280.
 Whistling, 52.
Swift, Black, 282.
 Chimney, 259.
Sylvia agilis, 383.

Sylvia cœrulea, 216.
 carbonata, 74.
 montana, 74, 361.
 philadelphica, 383.
 rara, 216.
Sylvania mitrata, 169, 173.
Symphearia semipalmata, 22.
Syrnium nebulosum, 340.
 nebulosum helveolum, 340.
 varium, 340.
 varium allenii, 340.
 varium helveolum, 340.

TACHYGINETA bicolor, 23, 190.
thalassina, 190.
thalassina brachyptera, 79.
 354.
thalassina lepida, 208.
Tanager, Black-winged Palm, 398-402.
 Louisiana, 207.
 Western, 190.
Tanagra palmarum, 398.
 palmarum melanoptera, 398-402.
 palmarum palmarum, 398.
Tantalus loculator, 65, 210.
Tapera, 450.
Tartare, 391.
 æquinoctialis, 391.
 familiaris, 391.
 longirostris, 391.
 luscinia, 391.
 mendanæ, 391.
 pistor, 391.
 rehsei, 391.
 syrinx, 391.
Tatler, Wandering, 33.
Teal, Blue-winged, 278.
 Cinnamon, 278.
 Green-winged, 209, 278.
 Laysan, 384, 396.
Telespiza cantans, 384, 387.
Telmatodytes, 356.
 marianæ, 357.
 palustris, 356.
 palustris griseus, 356.
 palustris paludicola, 356.
 palustris plesius, 357.
Tern, Arctic, 127, 131.
 Black, 134, 440.
 Common, 127, 131.
 Forster's, 32.
 Grayback, 385.
 Least, 149.
 Noddy, 385.
 Royal, 149, 219.

Tern, Sooty, 292, 385.
 White, 385.
Tetrao lagopus, 252.
Thamnophilus doliatus, 291.
Thrasher, Brown, 266.
 Sage, 208.
Thrush, Gray-cheeked, 266.
 Hermit, 266, 284.
 Olive-backed, 285.
 Russet-backed, 192.
 Sierra Hermit, 192.
 Varied, 193.
Thryothorus guttulatus, 196.
 ludovicianus, 69.
 mexicanus, 196.
 murarius, 196.
Tiaris bicolor omissa, 14.
 olivacea bryanti, 14.
Tinnunculus, 339.
 phalœna, 339.
Todus multicolor, 225.
Torrey, Bradford, Sand Swallows
 nesting in sawdust, 436.
Totanus acuminatus, 336.
 damacensis, 336.
 melanoleucus, 22, 281.
 melanoleucus frazari, 19, 364.
Towhee, 265.
 Green-tailed, 190.
Townsend, Charles W., a case of
 mistaken diagnosis, 218.
Toxostoma rufum, 266.
Trichas, 383.
Trichoglossus, 310.
Tringa alpina, 337.
 bairdi, 280.
 couesi, 314.
 ferruginea, 337.
 fuscicollis, 336.
 maculata, 204, 280, 336.
 maritima, 335.
 minuta, 335.
 minutilla, 280, 336.
 ptilocnemis, 314, 335.
Tringoides macularius, 174.
Trochilus alexandri, 220.
 colubris, 23, 253.
Troglodytes aëdon parkmani, 192.
Trotter, Spencer, notes on the ornithological observations of Peter Kalm, 249-262.
Troupial, 12, 292.
Trowbridge, C. C., notice of his paper on 'The Relation of Wind to Bird Migration,' 228.
Turdus fuscescens, 170.
 migratorius, 261.

Turdus minor cinereo-albus non maculatus, 294.
mustelinus, 170.
polyglottos, 260, 295.
Turnstone, 167, 210.
Black, 33.
Turtur humilis, 228.
risorius, 228.
Tyrannus, 170.
borealis, 343.
dominicensis, 10, 194.
griseus, 173.
tyrannus, 23, 206.
verticalis, 206.

URIA lomvia, 51.

VAN DYKE, T. S., see Sanford, L. C.

Vermont Bird Club, second annual meeting of, 244.

Vireo bellii, 438.
bellii medius, 447.
calidris, 177, 193, 194.
calidris barbatula, 16.
crassirostris, 173.
flavifrons, 173, 265.
gilvus swainsoni, 79, 190, 354.
latimeri, 16, 194.
olivaceus, 23, 370.
philadelphicus, 369-376.
solitarius, 265, 437.
solitarius cassini, 190.
swainsoni, 354.

Vireo, Bell's, 438.
Black-whiskered, 16.
Blue-headed, 265.
Cassin, 190.
Philadelphia, 369-376.
Red-eyed, 372.
Solitary, 372, 437.
Warbling, 372.
Western Warbling, 190, 354.
Yellow-throated, 265, 437.

Vireosylvia josephae, 324.

Vulture, Black, 67, 287.
Turkey, 53, 66, 183, 205.

WALTER, Herbert Eugene, and Alice Hall Walter, notice of their 'Wild Birds in City Parks, 316.

Warbler, Adelaid, 18.
Alaska Myrtle, 191.
Audubon's, 191, 284.
Bay-breasted, 309.
Black-and-white, 17, 195, 265.
Blackburnian, 265.

Warbler, Black-poll, 284.
Black-throated Green, 266, 309, 310.
Calaveras, 190.
Canadian, 266.
Cape May, 18, 218.
Cerulean, 265.
Connecticut, 266.
Golden Pileolated, 356.
Hermit, 191.
Hooded, 266, 438.
Kentucky, 439.
Kirtland's, 225, 459.
Lawrence's, 53.
Lutescent, 190.
Magnolia, 18, 284, 309, 310.
Mourning, 266.
Myrtle, 18, 195.
Orange-crowned, 283.
Palm, 18, 195, 266.
Parula, 18, 195.
Pileolated, 191.
Porto Rico Yellow, 18.
Prairie, 19, 195.
Sonora Yellow, 47.
Swainson's, 438.
Tennessee, 283, 309, 310.
Tolmie's, 191.
Townsend's, 191.
Western Yellow, 191.
Yellow, 208.

Warbler, The, notice of initial number of, 244.

Waterhouse, Charles Owen, notice of his 'Index Zoologicus,' 450.

Waters, Edward Stanley, obituary notice of, 243.

Water-Thrush, 19.
Grinnell's, 284.
Louisiana, 19, 307.

Waxwing, Bohemian, 283.
Cedar, 283.

Wayne, Arthur T., Richardson's Merlin (*Falco columbarius richardsoni*) on the coast of South Carolina, 67.

Weed, Clarence M., notice of his 'A Partial Bibliography of the Economic Relations of North American Birds,' 446.

Wheeloock, Irene Grosvenor, notice of her 'Nestlings of Forest and Marsh,' 231.

Whipperiwhip, 253.
Whipperiwill, 253.
Whip-poor-will, 253, 264.
Widgeon, 303.

Widgeon, European, 210, 303.
 Willet, 147, 148.
 Wilson Bulletin, The, review of
 Volume IX, new series, 225.
 Wilsonia canadensis, 266.
 microcephala, 74.
 mitrata, 266, 438.
 pusilla, 218.
 pusilla chryseola, 75, 356.
 pusilla pileolata, 191.
 Winkenwerder, H. A., notice of his
 'The Migration of Birds, with
 special reference to Nocturnal
 Flights,' 311.
 Woodcock, American, 210.
 Woodpecker, American Three-toed,
 282.
 Arctic Three-toed, 282.
 Batchelder's, 282.
 Black, 253.
 Bonaparte's, 290.
 Cabanis's, 183, 281.
 Gila, 44.
 Gold-winged, 254.
 Hairy, 264.
 Ivory-billed, 254.
 Lewis's, 184, 205.
 Northern Hairy, 281.
 Northern Pileated, 184.
 Pileated, 254, 282.
 Red-headed, 70, 255, 309.
 Red-bellied, 264, 305.
 Sierra Three-toed, 184.
 Southern White-headed, 222.
 Woodpecker, White-headed, 183.
 Willow, 341.
 Wren, Carolina, 69.
 Rock, 33, 208.
 Western Marsh, 208.
 XANTHOCEPHALUS xanthocephalus,
 186, 206, 282.
 Xema sabini, 433.
 Xenopus albolarvatus, 183.
 gravirostris, 222, 362.
 Xiphidiopicus percussus, 194.
 YELLOW-LEGS, Greater, 281.
 Yellow-throat, Rio Grande, 355.
 Salt Marsh, 355.
 Western, 191, 208.
 Young, Curtis Clay, obituary
 notice of, 94.
 ZAMELODIA melanocephala, 190,
 416.
 Zenaidura carolinensis, 324.
 macroura, 66, 177, 182, 205,
 263, 281.
 Zonotrichia albicollis, 265.
 fallax, 350.
 leucophrys, 188.
 leucophrys gambeli, 36, 188.
 leucophrys intermedia, 36.
 Zoölogical Quarterly, The, notice of,
 328.

ERRATA.

Page 69, line 16, for *phryothorus* read *Thryothorus*.
 Page 81, line 1, for Gadou read Gadow.
 Page 103, for Plate III read Plate IV.¹
 Page 109, footnote, for 1902 read 1901.
 Page 110, for Plate IV read Plate III.¹
 Page 172, line 9 from bottom, for *Oporonis* read *Oporornis*.
 Page 213, line 7, for *Psitacula* and *Psitacula* read, *Psittacula* and
Psittacula.
 Page 435, line 11 from bottom, for *purpurea* read *subis*.

¹ See p. 246, footnote, for fuller explanation.

GENERAL LIBRARY
UNIV. OF MICH.
OCT 7 1903

Old
Series,
Vol. XXVIII

CONTINUATION OF THE
BULLETIN OF THE NUTTALL ORNITHOLOGICAL CLUB

New
Series,
Vol. XX

The Auk

A Quarterly Journal of Ornithology

Vol. **XX**

—OCTOBER, 1903—

No. 4



PUBLISHED BY

The American Ornithologists' Union

— • —
CAMBRIDGE, MASS.

Entered as second-class mail matter in the Post Office at Boston, Mass.



CONTENTS.

	PAGE
FURTHER NOTES ON THE PHILADELPHIA VIREO, WITH DESCRIPTION OF THE NEST AND EGGS. By William Brewster. (Plate XI.)	369
AUDUBONIANA. By S. N. Rhoads.	378
NOTES ON THE BIRDS PECULIAR TO LAYSAN ISLAND, HAWAIIAN GROUP. By Walter K. Fisher. (Plates XII-XVI.)	384
THE BLACK-WINGED PALM TANAGER. By Austin H. Clark.	398
NOTES ON THE ANATOMY OF <i>Geospiza</i> , <i>Cocornis</i> AND <i>Certhidia</i> . By Robert E. Snodgrass. (Plates XVII-XX.)	402
A CONTRIBUTION TO THE LIFE HISTORY OF THE HERRING GULL (<i>Larus argentatus</i>) IN THE UNITED STATES. By William Dutcher and William L. Baily. (Plates XXI and XXII.)	417
A NEW SUBSPECIES OF NIGHTHAWK FROM THE BAHAMA ISLANDS. By J. H. Riley.	431
GENERAL NOTES.—Sabine's Gull at Monterey, California, 433; The Snowy Plover in the Bahamas, 433; Richardson's Owl (<i>Nyctala tengmalmi richardsoni</i>) in Illinois, 433; Capture of the Barn Owl (<i>Strix pyrrhocorax</i>) on Long Island, New York, 434; The Second Known Specimen of <i>Centurus cyanurus</i> Ridgway, 434; Nighthawk Migration in New Hampshire, 434; Nests and Eggs of <i>Calidreola clemenciae</i> , 435; Mortality of Purple Martins (<i>Progne purpurea</i>) at Brattleboro, Vt., 435; Sand Swallows (<i>Kiparis riparia</i>) Nesting in Sawdust, 436; An interesting Solitary Vireo (<i>Vireo solitarius</i>), 437; Bell's Vireo (<i>Vireo bellii</i>) in Colorado, 438; Nest and Eggs of the Swainson's Warbler (<i>Helminia swainsonii</i>), 438; Springfield, Mass., Bird Notes, 439; Some New Records for Nova Scotia, 439; Formalin Fails as an Insecticide for Dermestes, 440.	
RECENT LITERATURE.—Macoun's 'Catalogue of Canadian Birds,' Part II, 441; Dresser's 'A Manual of Palaeartic Birds,' 441; Huntington's 'Our Feathered Game,' 443; Degen on the "Perennial Molt" of the Australian Piping Crow, 444; Weed's Bibliography of Economic Ornithology, 446; Howe and Sturtevant's Revised List of the Birds of Rhode Island, 446; Stone on Birds of Southern New Mexico and Western Texas, 447; Oberholser on New Birds from Texas, 447; Bonhote's List of Birds collected in the Bahamas, 447; Sherborn's 'Index Animalium,' 448; 'The Index Zoologicus,' 450; Ornithological Magazines—'The Osprey,' 451; Chapman's 'The Economic Value of Birds to the State,' 453; Publications Received, 454.	
CORRESPONDENCE.—The Use of Trinomials, 456.	
NOTES AND NEWS.—The Twenty-first Congress of the American Ornithologists' Union, 457; Obituary: Prof. Wilbur Clinton Knight, 457; Dr. Gustav F. R. von Raddi, 458. Discovery of the Breeding Area of Kirtland's Warbler, 459; Annual Meeting of the British Ornithologists' Union, 1903, 459; Parrots in the London Zoological Society's Gardens, 460; 'Our Animal Friends,' 460.	
INDEX	461
ERRATA	480
CONTENTS OF VOLUME XX	iii
OFFICERS, COMMITTEES, AND MEMBERS OF THE AMERICAN ORNITHOLOGISTS' UNION, 1902-1903.	ix

'THE AUK,' published as the Organ of the AMERICAN ORNITHOLOGISTS' UNION, is edited by Dr. J. A. ALLEN, with the assistance of MR. FRANK M. CHAPMAN.

TERMS:—\$3.00 a year, including postage, strictly in advance. Single numbers, 75 cents. Free to Honorary Fellows, and to Fellows, Members, and Associates of the A. O. U. not in arrears for dues.

Subscriptions and Advertisements should be addressed to 'THE AUK,' 30 BOYLSTON STREET, CAMBRIDGE, MASS., or to WILLIAM DUTCHER, Business Manager, 525 MANHATTAN AVE., NEW YORK, N. Y. Foreign Subscribers may obtain 'THE AUK' through GURNEY AND JACKSON, 1 PATERNOSTER ROW, LONDON.

All articles and communications intended for publication and all books and publications for notice, should be sent to Dr. J. A. ALLEN, AMERICAN MUSEUM OF NATURAL HISTORY, CENTRAL PARK, NEW YORK CITY.

Manuscripts for general articles should reach the editor at least six weeks before the date of the number for which they are intended, and manuscripts for 'General Notes' and 'Recent Literature' not later than the first of the month preceding the date of the number in which it is desired they shall appear.